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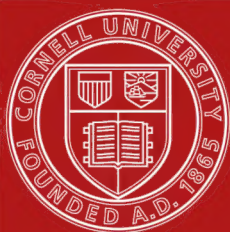
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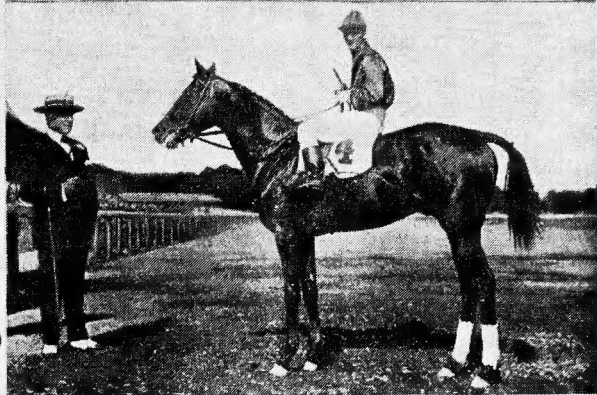
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BOLIVIA

ITS PEOPLE AND ITS RESOURCES
ITS RAILWAYS, MINES, AND
RUBBER-FORESTS

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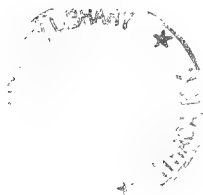
PAUL WALLE

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INTRODUCTION

IF there is one country among all others concerning which our knowledge is scanty and even at fault, that country is Bolivia, although the Republic is possessed of innumerable resources, and offers many advantages to men of action who have capital or labour to invest.

Hitherto, indeed, the territory of Bolivia, the riches contained in her soil, and the possibilities of her future have been all but unknown. This ignorance is due to a lack of that practical publicity which might have made known to the outer world those incomparable economic resources which, in the absence of labour and capital, are as yet unexploited. Among the books, relatively few in number, which deal with Bolivia, the most noteworthy and the most impartial have been written by Frenchmen,¹ but unfortunately the most recent of these are nearly thirty years old. Books written in English or German have been even less numerous of late years. According to the Bolivians themselves, these books, which are not for the most part of great importance, consist of little more than hasty impressions of travel.

¹ Among others may be named : *Fragments d'un voyage au centre de l'Amérique méridionale. Description géographique, historique, et statistique de la Bolivie*, with 14 maps in colour, by A. d'Orbigny, Paris, 1845. These volumes, despite their antiquity, are greatly valued in Bolivia. Then come other works by Weddel, Bresson, Wiener, etc.

A reader who should rely solely on these publications might be seriously misled.

The statistics relating to Bolivia, which have hitherto been incomplete or inexact, have only since 1910-11 provided us with significant data.

In the years 1911-12 the writer of these lines was sent to Chile and Bolivia by the Ministry of Commerce, and was thus, on the occasion of his second visit to the latter country, enabled to note the material progress accomplished since his previous journey, which was undertaken twelve years earlier. Excepting the native life of the country, which does not change, everything was different ; and it was with some surprise, for he had not been warned of the change which the country had undergone, that he noted the improvements to be observed in the various manifestations of administrative and public activity. For instance, the virtual capital, La Paz, had doubled its population, and the means of communication giving access thereto were both more numerous and more convenient.

Situated in the centre of South America, Bolivia covers an enormous territorial expanse ; it comprises tracts which produce the fruits proper to all climates, from the potato, which is found even in the regions of snow, to quinquina, rubber, coca, coffee, cocoa, and the sugar-cane, which can only be grown under the sun of the tropics.

In the eyes of many persons Bolivia appears as a remote and inaccessible country ; and the impression of its extreme remoteness from Europe is increased by the fact that the disastrous war of the Pacific (1879-83) completely deprived the country of its littoral. In reality this littoral, which lay at a great distance from the really populous regions of the Republic, had played but a very insignificant part in its development ; and this fact was until lately a considerable obstacle to the economic progress of

the country, despite the improved administration and the profound peace which Bolivia has for the last twelve years and more enjoyed. The mining industry, although the most active, was limited to the exploitation of a few tin, copper, and silver mines in the Andean region. The deep, fertile, temperate valleys of the central departments, the forests and prairies which cover the great plains of the east and south-east, are connected with the basin of the Amazon or that of the Plata by a multitude of water-courses ; and these regions, which the trade of the future will find an abundant source of profit, remained unexploited because lacking in communications and in labour.

The causes of the tardy development of Bolivia are of several kinds ; in the first place we may count the lack of proper means of communication between the departments, and a somewhat scanty population, and one addicted to a spirit of routine and refractory to all progress. The territory of Bolivia, of enormous extent and full of variety, can hardly be expected to lend itself to a parallel development of its different sources of energy, which are, as yet, by no means numerous. The scarcity of means of communication is such that the populations of the different centres are as yet without common hopes and aims, and know nothing of that cohesion which spells strength. Each region lives and depends upon itself, in isolation, conserving all its peculiarities, and especially its susceptibilities ; a cause of differences which the observer cannot fail to note.

From our recent sojourn among the men and things of Bolivia¹ we brought away a marked im-

¹ In the course of our travels we were welcomed and assisted by the governmental authorities of La Paz, who kindly recommended us to the officials of the departments through which we passed. Although we may not everywhere have found the same competence and the same degree of knowledge—and this might well be due to

pression that the nation is most certainly entering upon a period of intellectual and economic transformation. Its industries are being developed, and its wealth, hitherto almost unexploited, is daily attracting the attention and co-operation of external capital. By this process of evolution, which is slowly but surely going forward, the country is already deriving substantial profit.

The fact that the bonds of its first European loan, which were issued in 1910, enjoy the favour of French investors and are frequently quoted above par, is a proof of the confidence which Bolivia has begun to inspire in the world of credit. The rise in the prices of tin and copper, to speak only of these two chief items of Bolivian exportation, which has now been maintained for nearly two years, has greatly contributed to the improvement of the economic situation.

Deprived of its modest littoral at the close of the Pacific War, Bolivia, isolated and far from the coast, seemed condemned to vegetate miserably, the chief obstacle to its industrial and commercial development being the almost absolute lack of easy means of communication. To-day we are forced to revise this opinion ; Bolivia is very much alive, is no longer

ethnic factors—we were always received with the greatest urbanity and perfect good-will. We must refer in particular to Señor Claudio Pinilla, then Minister of Foreign Affairs and now of Finance ; to Señor B. Mariaca, Minister of Public Instruction and Agriculture ; and to the Minister of Justice and Industry, who greatly facilitated the accomplishment of our task, and to whom we owe our sincerest thanks. We must especially thank Señor M. V. Ballivian, President of the Geographical Society of La Paz, and Director of the Bureau of Statistics and Geographical Research, a true apostle of advertisement in all matters concerning his country ; thanks to him, the documentation of our inquiries was as full and as recent as possible, the facts and figures provided being collected or compiled by his Bureau. Controlled and verified by our own experience, these data proved a valuable guide, and greatly facilitated our labours.

isolated from the rest of the world, and is no farther from Europe than its neighbours. To-day three lines of railway connect La Paz and the principal cities of the high Bolivian tablelands with the ports of the Pacific : Antofagasta, Mollendo, and Arica. The last line to be constructed, which has recently been opened to traffic, is the shortest and most convenient, and will exercise the greatest influence on the future of the country.

The Bolivian Government, whose praiseworthy efforts deserve recognition, has adopted a plan of railway-construction whose fundamental object is to facilitate expansion toward the two oceans, by means of branch lines radiating from the principal railway system, the Antofagasta-Oruro-La Paz Railway. One of the three branch lines now under construction, that running to Rio Mulato and Potosi, has been recently inaugurated ; the Oruro-Cochabamba branch may be regarded as completed, thus creating an outlet from that department in which the population is densest, the soil most fertile, and the climate most favourable. The third line, running to Uyuni and Tupiza, in the direction of the Argentine frontier, is rapidly going forward ; when it is completed there will be only one break of some fifty miles to be filled in, and it will be possible to travel without a change of cars from Buenos Ayres to the Peruvian frontier in less than five days, while La Paz will be twenty-four to twenty-five days from the ports of Europe. The construction of this branch has just been entrusted to a French syndicate. Meanwhile the Mamoré-Madeira line, which has for some time been open to traffic over almost the whole of its course, and in the present year (1914) should be completely open, affords an outlet to the Atlantic, by way of the Amazon, for the rich natural products of eastern Bolivia.

Another reason for confidence is to be found in the political stability of the country. We shall not go

so far as to say that the reign of the politician is over, but there is no doubt that his prestige is declining ; candidates for the legislative mandate are now obliged to produce economic programmes ; the cliques which were once omnipotent see their clients turn away ; the remark of Baron Louis is everywhere true : " Show me sound politics, and I will show you sound finance." Bolivian politics has for some years manifested a very sensible improvement.

Since 1900 Bolivia has given undeniable proofs of a re-orientation of its domestic politics. The elections of 1904 and 1908 were perfectly peaceful. The Governments of General Pando, Dr. Ismaël Montes, and Señor E. Villazon have seriously devoted themselves to the solution of the economic problems in which the country is interested. An event of considerable importance occurred in October, 1904, when Chile and Bolivia signed a final treaty of peace and amity intended to replace the Peace Treaty dating from 1884. This arrangement satisfactorily terminated one of the old quarrels of the Pacific, and allowed Bolivia to recover her fiscal liberty. Previous to this treaty Bolivia was almost entirely dependent, economically, upon Chile and Peru, being bound to the latter by a commercial treaty which enabled Peru to flood the northern portion of the country with articles of prime necessity.

General Pando was the sponsor of the liberal reforms by which Bolivia is profiting to-day. His successor, General Montes, who was actuated by an essentially modern spirit, had a profound knowledge of the resources and the needs of his country, and understanding the advantages which its situation offered, he excited the competition of the surrounding States to the profit of his own country. With the £1,000,000 paid by Chile, and the £2,000,000 paid by Brazil for the territory of Acre, General Montes commenced the construction of the trunk and

branch railways of which we have already spoken. Despite these efforts, when President Villazon, whose Government terminated in October, 1913, came into power, the country was still suffering from the effects of an excessively long economic crisis. The scarcity of capital was such that the most insignificant transactions were often paralysed. It was then that Señor Villazon conceived the idea of attracting European capital for the purpose of establishing a great bank, and thereby stimulating the industrial and commercial life of the country. The loan of £1,500,000 sterling, which was concluded in 1910, under the auspices of the *Crédit Mobilier Français*, made it possible to found the Bank of the Bolivian Nation, with a capital of £1,270,000, of which £1,000,000 was found by the State. The results hitherto obtained from this bank have been extremely encouraging.

The hopeful direction imparted to public affairs by the recent heads of the State will in no wise be modified by the advent of the new President, who was elected at the elections of 1913, for the latter, the sole candidate selected by the great majority of voters, is one of the protagonists of Bolivian progress, being none other than General Ismaël Montes, who only yesterday represented his country so worthily in France, England, and Holland. This is a guarantee for the immediate future of Bolivia ; for Montes, who is a man of a broad and open mind, well prepared for the task of government, and is endowed with a character of great firmness, will complete the work inaugurated by himself and continued by his successor and predecessor, Señor Villazon.

In this State, where individual initiative is feeble and routine is triumphant in all the branches of agriculture, while education is still defective, it is indispensable that the Government should make its influence felt by discovering new sources of produc-

tion and improving those that already exist. Having regard to the past record and the exceptional merits of the distinguished statesman who has lately assumed the reins of power, it is certain that the progress of Bolivia will be assured, and will, under his administration, make fresh strides in a forward direction.

At present every effort is being made to stimulate the mining industry, which has already yielded immense wealth and almost immediate results. For several years it has undeniably shown progress, the market prices of the products having been more remunerative; the *Monografia de la Industria Minera*, which President Villazon caused to be published in 1910, having registered, besides enormous tracts of argentiferous measures, no less than 126 tin mines (which are nearly always silver mines as well), 72 gold, 42 copper, 16 wolfram, and 3 bismuth mines, all more or less actively worked or investigated with a view to working. There are many establishments equipped with modern plant, dealing more particularly with tin, silver, copper, and bismuth. Rich new veins of these metals have been discovered, which should contribute to the prosperity of the departments of La Paz, Oruro, and Cochabamba.

The exportation of the ores of wolfram, antimony, and pitchblende is becoming more and more of a regular thing as the facilities of transport and the railway rates increase and decrease respectively. The gold mines are beginning to attract the attention of considerable financiers. Fresh diminutions of the tax on metals, the existence of railways, and the construction of branch lines uniting the chief centres of the Republic, and passing in proximity to the great mineral measures, are the causes of the active movement which is to be observed at the present moment. As the railway systems expand the mining

industry will certainly be productive of fresh surprises.

Certainly the mining law of Bolivia suffers as yet from imperfections and lacunæ, which are undoubtedly due to its too great liberality ; it has evoked many complaints, and has sometimes hampered the normal development of the industry. But thought is being taken daily to improve it, and, to tell the truth, as we shall demonstrate in the course of this volume, the responsibility for very many difficulties should be attributed to those very persons who willingly suffer them, because they do not wish to be surrounded by elementary precautions, and are anxious to maintain titles which are neither intelligible nor precise and often form a basis for chicanery which the mineowner is very well content to evoke.

Already, profiting by the means of communication now extant, many syndicates are prospecting the thousands of unexploited lodes to be found in the measures of the three principal mining districts. Wherever such work has been undertaken and seriously accomplished by a really competent staff the results have generously rewarded the adventurous investor.

But Bolivia is rich not merely in mines of all descriptions ; the vegetable kingdom is equally well represented. If the vegetation is poor and sickly on the lofty tablelands and the upper heights of the Andes, in the valleys which run from the farther side of the eastern Cordillera into the almost utter solitudes of the Territory of Colonias, El Beni, Santa Cruz, and the Gran Chaco the vegetation is as rich as it is varied, and comprises such valuable products as rubber and quinine, to mention only these two. These vast plains, over which perpetual summer reigns, will one day be the source of innumerable natural products, which will find their way to the

Atlantic by the Amazon or the Rio de la Plata, and will bring in exchange the manufactured products of civilization.

Without representing Bolivia as a great market and centre of consumption (hitherto, indeed, it has provided but few customers, the population not exceeding 2,200,000, of which the majority do not as yet consume European products), we are of opinion that continued indifference would be a grave mistake, especially now that the Panama Canal is about to be opened. While awaiting this event the leading commercial nations have directed their eyes towards the Pacific coast, and are already laying the foundations of future trade. The Americans of the United States, who are increasingly prone to regard South America as a field reserved for their activities exclusively, manifest the utmost eagerness to increase their influence there simultaneously with the value of their exports. But England and Germany have not as yet lost their lead.¹ These three countries are those with which Bolivia has the most extensive commercial relations; next to them, and a long way before Peru, comes Chile; then come Belgium, France, the Argentine, Italy, Spain, and Brazil.

That important event, the opening of the Panama Canal, is already regarded with the keenest interest in commercial and financial circles. This new commercial highway will induce new streams of international trade, which, in proportion as they develop, will evoke new and abundant sources of wealth. It seems certain that the Republics of the Pacific coast, from Mexico to Chile—that is, from 25° north lati-

¹ Germany is slightly ahead of England. France is seventh on the list. During the period 1906-10 England and Germany exported goods to Bolivia to the value of over £3,400,000; France to the value of £680,000. But these figures are not exact, as the Bolivian statistics refer solely to the port of embarkation entered on the consular invoices.

tude to 23° south—poor as they have hitherto been in the matter of external communications, and unable to realize their great natural wealth, will find in the opening of the Canal the commencement of an interesting economic advance. Especially will this be the case with Colombia, Peru, and Bolivia ; for the benefit of the Canal should be perceptible along the Chilian coast as far as Antofagasta.

Commercial organizations, chambers of commerce, manufacturers, exporters, and importers should already be making preparations for the great event. They should carefully investigate the vast and almost virgin field of commercial exchange which will suddenly be made accessible by the opening of the direct maritime route. They should learn what it is that the Republics of the South wish to buy and to sell. They should take note of competitors—European, American, or Japanese. They should look into the climatic, physical, material, and industrial conditions of those enormous and wealthy countries which are bathed by the Pacific Ocean and are now about to enter upon a new era of progress and prosperity. The great battles of the future will be fought on the economic field, and victory will be on the side of the best prepared.

P. W.

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BOLIVIA

CHAPTER I

HOW TO REACH BOLIVIA

I. The available routes. The Buenos Ayres-Cordilleras-Valparaiso-Antofagasta route. Time and money required.—II. The Colon-Panama-Mollendo or Arica route.—III. The Buenos Ayres-La Quiaca-Tupiza-Uyuni route.—IV. From La Quiaca to Uyuni. Indian postilions.—V. Future routes.—VI. Still other routes.

I. EUROPEANS have been in the habit of regarding Bolivia, whose geographical remoteness is undeniable, as an inaccessible country. This habit is based on ignorance of the means of access and the ease with which this may be accomplished. People are still influenced by the bad reputation of the highways crossing the higher table-lands, which in the remoter departments and territories are frankly atrocious. Travellers who have not armed themselves with precise information will lose their way, and waste time in changing from one route to another. In order to facilitate the drafting of an estimate of expenses, which is highly advisable in the case of such a journey, we shall explain how this is best accomplished, and what it should cost.

Setting aside the route up the Amazon by way of the Madeira and Beni Rivers, and the route up the Rio de la Plata and across Paraguay, both of

which are extremely long, and only employed by those who wish to attain the extreme east of the country, Bolivia is now accessible from four bases : there is now direct and convenient communication with the chief cities of the high table-lands, Oruro, Potosi, Cochabamba, and La Paz. These may be reached by three principal routes, and as we have followed all three the information here given may be relied upon.

First route : Buenos Ayres-Cordilleras-Valparaiso-Antofagasta. From Southampton or Liverpool to Buenos Ayres by the steamers of the Royal Mail service the fares are as follows : First class, £39 ; second class, £22 ; steerage, £7.

From Buenos Ayres to Valparaiso, by the Trans-Andean Railway (departures Sundays, Tuesdays, and Thursdays at eight o'clock in the morning) : First class, £12 18s., sleeping accommodation included, plus £1 for meals ; second class, £8 5s. 10d. ; length of journey, 36 hours.

From Valparaiso to Antofagasta, by the steamers of the Pacific Steam Navigation Company, the Chilean South American Company, and the German Kosmos line. Fare, £6 10s. ; length of voyage, 3 to 4 days by those boats which call at intermediate ports ; 2 days if the passage is direct.

From Antofagasta to Oruro and La Paz by the Antofagasta and Bolivian Railway, a journey of 48 hours by direct services starting on Wednesdays and Saturdays at 6 p.m. Fare, £6 16s., plus £2 for meals and other extras.

This gives us a total of £65 4s. for first class. By travelling second class to Valparaiso this is reduced to £43 11s. 10d. £4 at least should be allowed for food in the restaurant-cars.

Those who care to travel overland to Marseilles and take passage by the Transports Maritimes will find the first class somewhat cheaper : £30 first class

to Buenos Ayres, or £22 second. The total for the whole journey will then work out at £56 4s., or £43 11s. 10d. The Buenos Ayres route is as yet the quickest and most comfortable. The total duration of the voyage is 27 to 28 days.

II. Second route : Liverpool or Southampton to Colon ; Colon to Panama, thence to Mollendo in Peru. Fares to Panama : First class, £30 12s. 6d. ; second, £20 10s. ; third, £12 10s. ; or through to Mollendo : first class, £66 8s., £60 8s., and £56 8s., according to accommodation ; second, £46 8s. ; third, £21 12s.

From Mollendo to La Paz, by Arequipa, Puno, and Lake Titicaca (530 miles). Since April, 1911, the Peruvian Corporation has established a service of express trains with sleeping and restaurant cars. At Puno the traveller alights for the passage across the lake, which is effected during the night, landing at Huaqui, whence the railway takes him in 4 hours to La Paz. The whole journey takes 35 hours. The return journey requires only 29 hours (departures Mondays and Fridays). Fares, £4 sterling, plus about £2 for meals.

By this route the total cost of the journey is £64 8s. first class (taking the fare to Mollendo as £60 8s.), or £50 8s. second class ; the time required being 30 to 31 days.

Since September, 1912, passengers may take advantage of the new railway from Arica to La Paz. Arica, which lies about midway between Antofagasta and Mollendo, offers a better anchorage than the latter ; landing is easily effected, and the distance to La Paz is only some 270 miles, which are covered in 12 or 14 hours. Fare, £2 sterling. The steamer fare costs £2 or £3 more.

III. Third route : Liverpool or Southampton-Buenos Ayres-La Quiaca-Tupiza-Uyuni-La Paz. This route, which will soon be the shortest and quickest

of any, can at present be recommended only to those travelling with light baggage, who do not fear fatigue and lack of comfort.

From Buenos Ayres (departures Mondays, Wednesdays, and Fridays) the traveller proceeds to La Quiaca, a village on the Bolivian frontier, by the Central North Argentine Railway (sleeping and restaurant cars). The distance—1,140 miles—is covered in 48 hours, to which we must add a night passed at Jujuy. Fare, £8 12s. 10d., plus 10s. for sleeping accommodation and £1 18s. 6d. for meals, a total of £11 1s. 4d.; 50 kilos or 1 cwt. of baggage may be carried free of payment.

As far as La Quiaca the journey is comfortable and easy; but from that point to Uyuni, a station on the Antofagasta line, there is a stretch of 214 miles which must be travelled on mule-back, or by diligence, or *carretaras*, according to the season, the best time for this journey being the dry season from April to November. The ride on mule-back is naturally rather painful to those who are not accustomed to that form of progress, and it also requires more time; neither can one look for any comfort during halts, for once beyond Tupiza, the first halting-place, which is some sixty miles from the frontier, the route passes nothing more ambitious than the villages of the Quechua Indians.

IV. The railway now being constructed between Uyuni and Tupiza is already completed for about one-half of its length. The 158 miles between Tupiza and Uyuni are therefore divided into three stages, the traveller breaking his journey at Escoriani and Chivas, where he will sleep on a camp bed or a string mattress; and he will do well to provide himself with warm blankets. At most relays one halts fifteen minutes to change the mules, which is increased to half an hour when a meal is taken. Uyuni forms the third stage of the journey. The

relays are fairly equidistant ; there are never less than two in the day's march. The diligence rolls on over hill and through valley from sunrise to sunset. One circumstance will strike the traveller unused to Bolivian travel ; he will see two young Quechua Indians, running one on either side of the mules, which are harnessed in couples ; they are armed with short whips adorned by numerous rings of iron, which they continually crack, thus exciting the mules ; or from time to time they throw small stones at those beasts which are not within reach. At every step they leap over the rocks and boulders which abound on the rudimentary highway, sliding and slipping on the ice and hardened snow, gesticulating, shouting, and whistling in turns.

One must indeed be, as these Indians are, indefatigable, in order to indulge in such violent exercise at an altitude of nearly 10,000 feet, where the least effort may result in mountain sickness. However, these young Indian postilions make nothing of covering the sixty-mile stages as I have described ; on arriving at the relay or posting-station they seem barely fatigued, and busy themselves with the baggage. A few minutes' rest on one of the steps of the diligence, as it jolts and squeaks along the track, and they soon regain their breath. Uyuni is reached on the fourth day out from La Quiaca. The landscape along the route is barren, cold, and monotonous, with terrific climbs and precipitous descents.

By diligence the fare is 90 Bolivians or 180 francs = £7 4s., plus 32s. for food and lodging. The traveller must not be too exacting ; he must expect a certain degree of privation. The company known as *Carretara* accepts only pieces of baggage weighing less than 50 kilos. Excess baggage beyond 50 kilos is charged at the rate of 40 centavos the kilo, or rather less than 4d. per lb.

At Uyuni the traveller takes the train for Oruro and La Paz. The distance is 340 miles, the time taken is 18 hours, and the fare is £3 4s. The total cost of the journey from Buenos Ayres to La Paz by this route (1,640 miles), is £23 8s. 10d., to which we must add £39 or £22 for the fare from Liverpool or Southampton to Buenos Ayres, which gives a total of £62 8s. 10d. first class, and £45 8s. 10d. second. Length of sea passage, 20 days ; overland journey, 8 days ; total, 28.

Despite the inconvenience of the journey through La Quiaca and Uyuni this route is really considerably the shortest, and is slightly less expensive than the others. It will be both quicker and cheaper when the railway which is rapidly being built between Tupiza and Uyuni is completed, as it will be in 1914, and when the Tupiza-La Quiaca branch is open. By that time, thanks to competition between the various steamship companies, the voyage to Buenos Ayres will occupy only 15 days, and 5 or 6 days will suffice for the journey to La Paz, or 21 days in all.

In the future this route will be preferred to the rest. It is already recommended to travellers who wish to visit only the southern portions of Bolivia, or to reach Tarija, Potosi, or Sucre. In the chapter dealing with internal highways the reader will find the necessary information as to the organization of caravans and mule-trains, and the agreements to be concluded between travellers and muleteers.

We must not omit mention of a route which may perhaps in the near future lead to the development of the vast and fertile region of Santa Cruz. A Brazilian railway, the North-Western, connects Bauru with the railways of the State of San Paulo, which themselves radiate from the port of Santos ; it crosses the Parana by means of a huge bridge, not far

from the Falls of Itapura, crosses the State of Matto Grosso almost in a straight line, and finally reaches the port and riverside city of Corumba on the Paraguay.

This railway is already considerably advanced ; for we utilized a long section of it during our travels in Brazil, and it is hoped that it will be completed by the end of 1914. The journey from Santos to Corumba will then occupy four days, which will bring it to within nineteen days of Europe, whereas it now takes more than twice as long. Across the river from Corumba is Puerto Suarez, a Bolivian customs post, which, according to the programme of the Government, will be connected with Santa Cruz by a line which is now under survey. The fares to Santos are £34, £22, and £7.

VI. To the routes already mentioned we must add the route through the Straits of Magellan, which before the Trans-Andean railway was opened was much frequented by travellers, in spite of the twelve days' extra navigation necessitated thereby. Even after the Panama Canal is opened it will serve for the transport of merchandise, and even for a certain number of passengers, for the influence of the Canal will not be felt appreciably below the latitude of Antofagasta, as we have already explained. The cost of the passage from Europe to the latter port is £62 9s. 6d. first, £38 6s. 5d. second, and £23 4s. third, by the steamers of the Pacific Steam Navigation Company. The length of the sea passage is 36 days.

The two riverine routes, the Amazon-Madeira-Mamoré and the Paraguay-La Plata route, are so far only practicable when the traveller wishes to reach certain determined regions, as we shall see later on.

The cargo boats of the larger steamship lines and

vessels from outside ports touching at the required ports will often take passengers, and the fares will be 25 to 30 per cent. less, while accommodation is often better, as there is no overcrowding on such vessels. The time of passage will, of course, be longer.

CHAPTER II

FROM ANTOFAGASTA TO LA PAZ

- I. Antofagasta. The trains of the Bolivian Railway Company.—
- II. The nitrate works.—III. Climbing the Cordillera. Calama. The Rio Loa.—IV. Drinking-water conveyed a distance of 200 miles. The volcanoes San Pedro and San Pablo. Ascotan. The borax lake of Cebollar.—V. Ollagüe. The frontier. The high table-land or *altoplano* of Bolivia.—
- VI. Scanty population; maddening monotony of the landscape.—VII. Native villages and caravans.—VIII. Native crops. Viacha.

I. HAVING just completed a visit to the Chilian coast, and wishing to attain the high table-lands of the great Cordillera of the Andes, we chose on this occasion the Antofagasta route, that port being the terminus of the railway which puts the traveller in touch with the historic land of the Incas.

The steamship *Thuringia*, of the Kosmos line,¹ on board of which we took our passage, arrived in the vast bay of Antofagasta in the middle of the night. This port being insufficiently sheltered, there is at all times, but especially towards evening, a considerable swell which makes landing difficult. Landing is effected by means of heavy boats manned by sailors in the employ of the steamer companies, with whom it is well to strike a bargain beforehand. As a rule their charge is $2\frac{1}{2}$ piastres in Chilian currency—value

¹ A German line which competes very seriously with the English Pacific Steam Navigation Company and the Chilian South American Company.

two shillings—for a passenger without luggage, four or five piastres for a passenger with portmanteau and trunks, or more, according to the number of the latter, the whole being taken to the hotel or the railway-station, which is near the custom-house and the landing-stages.

The city of Antofagasta has reached considerable proportions and had greatly progressed since our former visit ; it is a vast goods depôt, and a centre of supplies for the great nitrate works of the country. It boasts a certain number of well-stocked shops and two passable hotels (eight to fifteen piastres a day).

A mixed train leaves daily, Sundays excepted, for Calama, Uyuni, Oruro, and La Paz, but it has neither sleeping nor restaurant cars, and is useful only for a short journey, as it takes no less than three to four days to cover the whole distance. We preferred to wait until the following afternoon for the direct express service, which twice weekly makes the journey in forty-eight hours. These trains have comfortable sleeping-cabins, which by day are converted into little compartments for two or four passengers.

The restaurant is remarkably well equipped, being provided, like the sleeping-berths, with electric light, heating apparatus, and ventilation, all very efficient ; the food, considering the latitude, is very fairly satisfactory. Places in these trains being numbered, it is as well to procure tickets in advance.

This railway is in itself extremely interesting by reason of its unusually small gauge, which is only 76 centimetres (30 inches), or a little more than half the standard gauge. Nevertheless, the carriages are almost as large, and the sleeping and restaurant cars as convenient as those on ordinary lines. The goods waggons have a capacity of twenty tons, or three times their own weight. The speed, once the Cordillera is crossed, is about twenty-five miles an hour, and the gradients are quite gentle.

On leaving Antofagasta the train, which has to attain a height of 12,800 feet, begins a rapid climb, and at the sixteenth mile we are already 1,800 feet above sea-level. At the twenty-second mile is the commencement of the branch line of sixty-eight miles, which runs to the *salitreras* or nitrate beds of Boquet. At the thirty-sixth mile is another branch line, running to the port of Mejillones, which was established in 1906 by the railway company; this port is very extensive, and affords a good anchorage, as it is sheltered from the south-west winds.

About the seventy-second mile we pass into the most important nitrate district of this part of Chile, and continue to run through it for a distance of thirty-four miles.

II. In this region, amid the table-lands or pampas, are some twenty *oficinas* or nitrate of soda works, which have been equipped by the aid of the most advanced discoveries of modern industry, this being true not only of the machinery, but also of the organization and distribution of the various works. The *caliche*, the raw material which furnishes the nitrate, is taken from the earth at a variable distance from the works.

These factories, with their chimney-stacks which never cease smoking, for the work goes on without interruption, have by daylight the appearance of enormous iron scaffoldings of several stories without walls or roof, for in this region it never rains. Seen from a distance at night through the windows of the railway carriage, the groups of powerful electric lights, with the multitude of smaller lamps which light the offices and the homes of the workmen, give these factories the look of enormous ocean liners. Coming nearer, one sees the flames of vast incandescent furnaces, divided by belts of shadow, which are presently pierced by the luminous clusters of great arc lamps. Around these furnaces one sees moving shadows occu-

pied by mysterious tasks, to which distance and darkness lend an aspect almost infernal.

III. About five in the morning we leave the nitrate zone and are approaching Calama, as is announced by the appearance of the Rio Loa. Overshadowed by the peaks of the Andes, this region is a veritable oasis amid the barren solitudes that surround it. At Calama we are only 147 miles from Antofagasta, but we are already 7,360 feet above the sea ; yet, despite the altitude, the eye rests with pleasure on the wide prairies, watered by the Loa. The surrounding mountains are seen to be barred with striations of varying colours, indicating the presence of lodes of silver or copper and other minerals.

In the days of the Incas, Calama was already an important copper-mining centre, and to-day there is an interesting foundry in the neighbourhood which utilizes the forces of the Rio Loa.

Eight miles farther we come to the little branch line, six miles in length, which runs to the copper mines of Chuquicamata, 8,760 feet above sea-level. Near the station of Conchi, which is 185 miles from the coast, we cross the famous viaduct over the Loa, which is one of the triumphs of modern engineering. It is a slender structure of steel, consisting of six sections of lattice girders, each of 78 feet span, and supported by towers of steel in shape like an Egyptian obelisk. The rails are 330 feet above the floor of the deep wide cañon, at the bottom of which the Loa flows like a thread of silver. Near the viaduct is the beginning of a branch line some twelve miles in length, which ascends to the copper mines of Conchi Viejo, 12,200 feet above the sea.

IV. At San Pedro, 195 miles from Antofagasta, and 10,480 feet above sea-level, the railway company has excavated, in the solid rock, the reservoirs which supply drinking-water to the city of Antofagasta, to the railway itself, and to the nitrate works, which

could not exist without this supply. With the exception of the Loa, which presently turns northward on its way to the sea, there is no river in this district, and it never rains, the condensation of moisture never exceeding a sort of mist. On the coast, at Antofagasta, there is no other fresh water than this, except such as is distilled from sea-water. The water which fills the reservoirs is taken from three springs, the most considerable of which flows from the slopes of Siloli, some thirty-seven miles to the north-west of the line, at an altitude of 14,370 feet ; it yields 6,000 tons of water daily, derived from the melting of the snows. From the reservoirs run conduits which extend for more than 190 miles before reaching Antofagasta. This water supply cost the railway company a million pounds sterling.

Shortly after leaving San Pedro the railway skirts the base of two majestic volcanoes, San Pedro and San Pablo. From the crater of the former a slender column of vapour constantly ascends. Although it has shown no other signs of activity since the Spanish conquest, it is obvious that an eruption took place before the conquest, and at no very remote period, as is proved by the huge blocks of stone scattered over the plain, and a stream of lava nearly two-thirds of a mile in width, which is traversed by the railway, and which is to all appearances as fresh as if it had been ejected only a few months ago.

Still we ascend, and at Ascotan, 223 miles from our starting-point, we reach the highest point of the whole line, 12,970 feet above sea-level, after which it immediately descends to 12,260 feet, the altitude of Cebollar, where the track lies alongside the wonderful lake of borax with its curiously indented shore. This lake, which is said to be the largest deposit of borax in the world, offers a picturesque spectacle, surrounded as it is by mountains covered with snow ; the spotless white of its surface is broken here and there

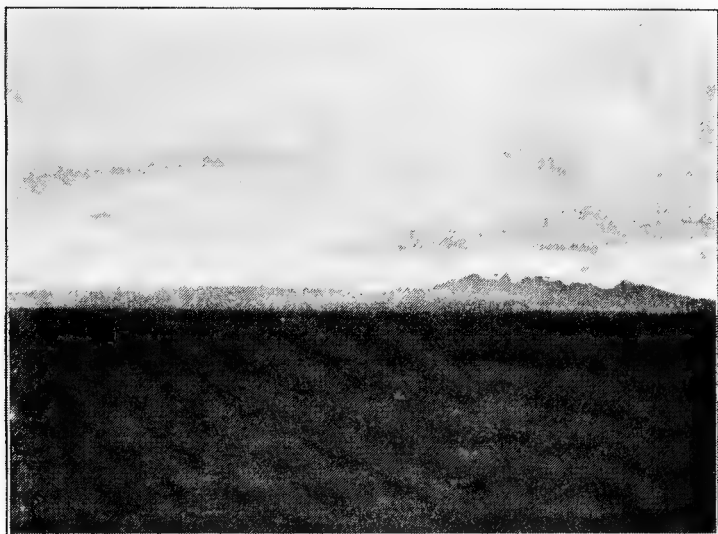
along the banks by water-holes, like wells of green water. The lake of Cebollar is the property of the Consolidated Borax Company, which exploits it.

V. At Ollagüe we are 270 miles from Antofagasta, and are approaching the line of the Chilean and Bolivian frontier. From Ollagüe, the last station on the Chilean section of the railway, we perceive the volcano of the same name, whose snow-covered summit rises to a height of 17,594 feet. From this point runs a branch line of sixty miles, which was built in 1907 by the Antofagasta Railway Company to serve an important group of copper mines at Collahuasi, which figure among the richest known. This railway is probably the loftiest in the world, for it runs to a height of 15,786 feet.¹ This portion of the journey is extremely impressive, and the traveller enjoys a continuous spectacle of snow-clad peaks.

Once across the frontier the line runs across the high table-lands at an almost constant level of 12,200 feet, until it reaches La Paz.

This part of the journey is not attractive. Everything is gigantic, but the monotony is maddening. No vegetation, only an interminable plain; naked, with mountains and volcanoes in the distance, encircling the horizon, now to the east, now to the west. In winter, during the dry season, there is a sinister quality about the aridity of the soil, and the mountains gleam on the horizon with a dazzling radiance. In the summer, the season of our present journey, it rains in torrents; at short intervals, during the whole of our journey across the high table-land, the sky was covered with low-lying, uniform clouds, and enormous tracts of the plain were covered with a shallow layer of water, an impermeable formation extending

¹ This altitude is now surpassed by the Potosi Railway, which crosses the Cordillera de los Frailes at a height of 15,810 feet. The Caldera tunnel on the Lima-Oroya line is only 15,560 feet above sea-level.



THE BORAX LAKE OF CEBOLLAR.



THE VOLCANO OLLAGÜE.

in all directions at a slight depth below the surface, so that the train seemed to be running over the waters of a vast lake.

Those who should judge Bolivia only by the *alto-plano*, ignoring the immense wealth which the land has yielded, and which its mountains still conceal, would form a melancholy idea of the country and its future. But we must not judge it by our first impressions.

VI. From Ollagüe to Uyuni is 108 miles. At Uyuni we find a population of 5,000 to 6,000, mostly Indians, and a curious market, which is well worth a visit. From this point we see llamas used as beasts of burden, travelling in little caravans of 50 or 100, loaded with small sacks of ore from the mountains of Potosi. Uyuni, Oruro, and Viacha are the only centres of population on the whole line from the frontier to La Paz, for in the neighbourhood of the railway-stations one seldom sees more than a handful of miserable native huts. From Uyuni runs the branch line of twenty miles which serves the far-famed silver mines of Huanchaca, and whose terminus is at Pulucayo, a town of some 8,000 inhabitants. These mines, of which we shall speak later on, are the property of the powerful and enterprising Franco-Anglo-Chilian company of the same name.

Leaving Uyuni, we journey onward toward Oruro ; at Rio Mulato we pass another line, 105 miles in length, running to Potosi. Still the horizon is the same ; the pitiless, mournful solitude is unchanged ; on either side of the track we see nothing but a vast uncultivated plain. Only at very long intervals do we pass a few native cabins, squat and poverty-stricken, constructed of *adobes*, that is, of bricks or blocks of sun-dried earth or clay ; huts with a conical roof of the same material, or perhaps of thatch, and usually looking ready to fall in. Now and again, too, we see

scanty flocks of sheep, browsing with difficulty, in the care of native children, on the rare patches of scanty grass which are scattered over the hungry soil.

At Huari, 497 miles from Antofagasta, we see on the left the mysterious lake of Pampas Aullagas, better known by the name of Poopo. After we have passed this, the only object of interest for many miles, the journey relapses into monotony until Oruro is reached. This city, of which we shall speak again, is 634 miles from Antofagasta and 12,120 feet above the sea. It is a busy centre of the mining industry, the terminus of the Antofagasta Railway and the commencement of the Bolivian Railway, which is administered by the same company. As the gauge of the Bolivian line is one metre, we have to change carriages at Oruro.

VII. Still we roll across the same plain ; still its surface is almost as level as that of a lake. At first the country traversed consists of wastes of sand or alkaline marshes, and for nearly twenty-five miles we encounter no signs of vegetation, and no drinkable water. After passing Caracollo the landscape undergoes a slight modification ; we perceive a scanty growth of bushes, eighteen inches or a couple of feet in height ; these are of a species of broom known as *tola*, which serves as the principal fuel of the district. In other places we see large patches of sombre green formed by a kind of peaty growth, which contains a quantity of resin ; this also is used as fuel, and is known as *yareta*.

This part of the country is not quite so deserted ; in many places we see the poverty-stricken native villages of which we have already spoken ; the habitations of the descendants of the Incas, which as far as their architecture is concerned belong to a period centuries earlier than the Spanish conquest. These wretched dwellings are all built with the door facing

the rising sun. There is little or no trace of wood in their construction. The modern Indian has confined himself, in the matter of architectural progress, to the use of a few scraps of wood to support the thatched roof or to form a door-lintel ; but for centuries he has introduced no other improvement into his dwelling.

More and more frequently, too, we see flocks of llamas, lightly laden, advancing at a rate of fifteen miles a day ; or natives, driving in front of them a few donkeys, bearing modest loads of fuel, grain, or minerals. Along the highways and footpaths one sees women with bare feet, or shod with leather sandals known as *ojotas*, the head covered with a round hat of undyed felt ; they move at a gentle trot, spinning yarn from the wool of the sheep or llama, bearing on their backs perhaps a child, perhaps a sack of vegetables or other produce, which they are carrying to or from the nearest market.

VIII. The plain, always hemmed in at a varying distance by the ramparts of the Cordillera, still preserves the same aspect ; but as the train approaches La Paz the scattered dwellings in the distance become more numerous, and a few modest patches of barley and potatoes are noted ; the tiny fields are often bordered with pebbles, and are not always cultivated in their entirety. The Indians still painfully till these fields by means of a primitive plough, consisting of a beam of wood with a cross-piece hardened in the fire, which serves as ploughshare. As a rule the Indian does not even use the droppings of his sheep to manure his crops.

At Viacha, some twenty miles from La Paz, we encounter an already large and increasing population, whose future is assured, for this locality is the point where three railways meet and cross : the Bolivian Railway, the line running to the Yungas, and the Arica Railway. At the time of our journey the stations of

these lines were being built, as well as a certain number of other buildings. From Viacha onwards the first of these lines, while waiting until its own permanent way was completed, as it nearly was, made use of that running from Huaqui to Lake Titicaca in order to reach La Paz.

CHAPTER III

LA PAZ

I. Arrival at the Alto of La Paz. A beautiful panorama. The descent.—II. A picturesque city ; a many-hued population.—III. Public markets. Police.—IV. Public places and promenades ; the Corso of the Plaza Murillo. Music. The little drummer-boys. — V. Public buildings. Churches. Politics.—VI. Population ; statistics of the different races. Constant increase. Foreigners.—VII. Commercial and industrial importance of La Paz.—VIII. Life in La Paz. Hotels ; cost of living ; rents of houses, etc. Carriages. Wages of artisans and domestic servants. Prices of staple foods.

I. LEAVING Oruro at half-past eight in the morning, the traveller reaches La Paz in the evening ; almost unawares, for nothing in the bare plain after he leaves Viacha foretells the approach to a city of such importance. It is still daylight, and the atmosphere is so limpid that from the height of the plateau known as the Alto (13,330 feet) which overlooks La Paz the traveller may admire the marvellous spectacle of the magnificent Illimani, whose peaks, covered with eternal snows, gleam amid other summits of lesser height and varying remoteness. To the left rises Huayna Potosi, whose three almost equal peaks are always snow-clad ; to the right is another giant, Mururata, whose form is that of a truncated cone.

From the crest of the Alto the eye plunges into an immense basin, on the bottom of which we see,

1,300 feet below, and almost perpendicularly beneath us, the compact and relatively crowded mass of dwellings which composes the capital city. The reddish tiles of the houses, the green patches formed by the trees and vegetation of the gardens, and the snow which gleams in the distance, paint this unique and beautiful picture in the most vivid colours.

La Paz¹ lies at a height of 12,730 feet, and at a distance of 718 miles from Antofagasta, in the depths of a valley which, seen from above, has the aspect of a vast crater, the city lying chiefly on one of its sloping sides. This colossal amphitheatre is surrounded by mountains whose flanks are alternately rocky or argillaceous ; checkered on the north and east by the squares of varied crops, which give a green and cheerful note to the landscape. A number of roads and footpaths run along the slopes, twisting into the most capricious curves.

Almost in the centre of the city flows the torrential Choqueyapu or Rio de La Paz, which fertilizes the plain that lies to the south ; while on the north the horizon is closed by the snowy peaks of the chain of the Andes. There are several other streams, and the floor of the valley is further furrowed by a number of sinuous ravines and crevasses.²

¹ The city of La Paz was founded in 1548 by Captain Alonso de Mendoza, who was accompanied by a dozen Spaniards ; the site chosen was that of the village of Chuquiyapu, founded about 1185 or 1190 by the fourth Inca, Maita Capac ; it was the last outpost towards the east of the great nation of the Collas, whose origin is lost in the mists of time.

² When we observe the situation of La Paz and remember that some four hundred volcanoes crown the western coast of the American continent, and when we recall the catastrophes due to eruptions and earthquakes, we marvel that this city has never been stricken by any of these disasters. Although it is highly probable that there are in the department of La Paz a certain number of peaks of volcanic origin which have not as yet been charted, at the present time we know of one only : the great mountain known as Molino Quemado, which is certainly of volcanic formation. It is



LA PAZ FROM THE ALTO.



VIEW OF LA PAZ.

Down to the year 1905 the trains arriving from Huaqui stopped on the Alto, and passengers had to descend the few miles of sloping highway which led into the city. To-day an electric locomotive is coupled to the train, and the latter descends, twisting and turning down a zigzag track, towards the curiously situated capital, which retains the picturesque qualities of the old Spanish cities of the Colonial period, as well as the local colour due to the descendants of the ancient subjects of the Incas. While ascending from or descending into the city by train one rarely fails to catch sight of one of the primitive coaches known as *carreteras*, descending a precipitous track at a dizzy speed, with many a jolt and shock, the mules going at full gallop, as though to afford a comparison between the locomotion of two different ages.

II. Arriving at the Challapampa station, and descending a flight of steps, we find ourselves in the Avenue Ismaël Montes, which skirts a portion of the Calle Choquiyapu and leads us in the direction of the principal streets of the city. Once we have penetrated the city we find that it no longer corresponds with our first impression. Apart from a local colour which one will scarcely find elsewhere save in Bogota, Quito, and in a less degree in Lima, and a few interesting churches, remarkable chiefly on account of their architecture, which is of a curious primitive quality peculiar to the region, with a few

true that whenever an eruption or an earthquake is felt with any severity on the coast of the South Pacific, in Chile, Peru, or Ecuador, the shocks are felt in La Paz, but especially when the Misti (near Arequipa in Peru) awakens from a long period of lethargy. As we have stated, however, these shocks are of the lightest, and do nothing worse than crack a few unsound walls. Such shocks were felt in 1877, 1888, and 1896. The only phenomena which cause a certain amount of damage are the subsidences which at long intervals have occurred in the mountains at some distance to the south-east of the city.

houses of the old colonial type, we find nothing very worthy of remark.

La Paz is one of the most higgledy-piggledy cities conceivable ; the streets, which suffer from no lack of name-plates, are narrow and extremely steep, and are paved with small cobbles or pebbles which are gathered from the bed of the river ; and as these pebbles are rubbed almost to a polish by the passage of man and beast, they make one's foothold insecure and walking a somewhat fatiguing and slippery business on a rainy day. By reason of the narrowness and steepness of the streets there are not many wheeled vehicles in La Paz. Travellers have affirmed that for these reasons La Paz never has boasted a tramway ; but they are mistaken ; to our surprise, we found an electric tramway running from the Challapampa railway station to San Jorge, and serving the principal business streets of the city, such as the Calle Comercio, Calle Illimani, Calle Mercado, etc.¹

These streets, which run parallel to the course of the river, are comparatively straight, as are the Calle Ingavi and the Calle Indaburu ; but the streets which cross these are all steeply sloping ; such as the streets entitled Yanacocha, Teatro, Loaiza, Socabaya, Ayacucho, Colon, etc. Nevertheless, these count among the principal streets of La Paz, and are the busiest and most crowded. For that matter all the streets are full of animation, and are constantly threaded by more or less numerous caravans of llamas, asses, and mules. They are thronged by a many-hued population composed of pure-blooded Indians, with negligent but picturesque garments ; cholas, or half-breed women, who are often pretty, and wear vivid colours,

¹ The Bolivian Rubber Company and the Bolivian Railway have commenced another tramway, which, starting from Parque Pando, will traverse the Calle Murillo and end by the Arica terminus.

coquettish and well put on, and round, flat-brimmed felt hats ; townsmen of white race ; creoles or foreigners ; and cholos, or half-breed men, of every colour and degree, who are to-day the most numerous of all, and in no way different in bearing from the European population.

III. On Sundays most of the streets of the lower part of the city are extremely animated ; for on this day the natives of the surrounding country come in to sell their produce, and temporary markets are established on the pavements. Amid piles of multi-coloured fruits peculiar to every climate one sees the most varied types and costumes ; Quechuas, Aymaras, cholos and cholas of every shade of brown ; ladies of La Paz, and European women of every condition ; all making their purchases, the whole forming a most curious and picturesque gathering.

The native population being as a rule extremely quiet and docile, the police of La Paz did not, to us, seem numerous. The force consists chiefly of Indians, clothed in a uniform like that worn by the *chasseurs à pied* of the French army, a flat cap replacing the *képi*. They are shod indifferently with boots, shoes, or—and these are more usual—a kind of heavy sandal with heels, retained by means of a strap across the instep, an improvement on the primitive native sandal or *ojota*. The task of the police is not very heavy ; they are busiest on fête-days and during Carnival, when the natives and half-breeds give way to their taste for alcohol. As a rule the offences committed are by no means serious. The Pacenos, as the people of La Paz are called, seem particularly addicted to the game of billiards, for in every street one hears the click of balls at all hours of the day.

IV. There are not many public squares or promenades in La Paz. Of the former, only the Plaza Murillo and the Plaza Alonso de Mendoza are worthy

of mention ; these are adorned with trees and shrubs. The Plaza San Francisco, the site of the market, where all the saleswomen are cholas, is only of small dimensions ; and there are four or five of the same kind. As promenades we can cite only the Avenidas Diez y Seis de Julio, the ancient Alameda, and the Avenida Arce, which, although leaving much to be desired here and there as regards the road-surface, is the favourite rendezvous of both townsfolk and foreigners, who go thither to stroll under the planes and eucalyptus-trees which border the highway. This avenue terminates at San Jorge, and is traversed by the electric tramway running from Challapampa station. On the left are deep ravines, and the bed of the Choquiyapu ; and along the whole route one has magnificent views of Illimani.

All this part of the town, which is comparatively of recent growth, is covered with chalets and well-built dwelling-houses, most of them pleasing to the eye, and inhabited by the wealthy business men of the city, or by foreigners ; it is or will be the fashionable quarter of the city. The whole of La Paz is lighted by electricity, the contract having been carried out by the French firm of Devés, which was formerly of great influence both in Bolivia and in Chili. The undertaking was not very prosperous, at first, on account of the cost of installation, but its affairs are now improving.

As in all Spanish-American cities of any importance, the Plaza de Armas, or Plaza Murillo, is the meeting-place of all the elect of the city ; on Sundays and Thursdays they repair thither in the evening. On these days, at five in the afternoon and nine in the evening, the military bands of the city play their best selections. These bands present a curious and somewhat bizarre appearance. On the occasion of our previous visit to La Paz we used to observe, filing into the Plaza or marching at the head of a



LA PAZ—CALLE DEL MERCADO.



LA PAZ—PLAZA MURILLO AND LEGISLATIVE PALACE.

regiment, a number of dusky musicians, preceded by several ranks of little drummer-boys who wore white baldrics, their sleeves being covered with white braid with a red edging, and their legs, like those of their seniors, clad in long white gaiters. They reminded us, by their uniforms, of the little drummer-boys and veteran soldiers immortalized by the French Revolution ; the long-dead past seemed to live again on the high Bolivian plateau. To-day you may still see the same little Bara or Viala Indians, with the same bronze complexions, and almost the same uniform ; but the musicians whom they precede are now, in the matter of costume and instruments, like any European military band.

V. Although La Paz is rich in picturesque spectacles, it has few remarkable monuments or public buildings. Among the most important of these we must mention the Legislative Palace, completed in 1904, on the Plaza Murillo (which houses the Congress and the Ministry of Foreign Affairs), the Government Palace, on the same Plaza, the Ministry of War and Colonization, the Palace of Instruction, the theatre, the Prefecture, the post-office, the Military College, and the Loaiza and Lundaeta hospitals. The Ministers and administrative authorities are lodged in buildings of quite secondary importance, some of which, however, date from the Colonial period.

La Paz contains a score of churches and chapels scattered throughout its different quarters, as well as a Methodist place of worship. A cathedral, which will eventually be an imposing fabric, has for some years been building on the Plaza Murillo, beside the Government Palace ; but as it is now only half completed, and as only a handful of Swiss stonecutters are at work upon it, some time will elapse before it can be available for worship. Among the churches of La Paz the most interesting in respect of their

external appearance are : Santo Domingo, founded in 1590, which serves as the cathedral ; San Francisco, founded in 1548, and San Sebastian, founded in 1570, both of which are curious ; and of modern churches La Recoleta, founded in 1896, etc. La Paz also boasts a University, a Seminary, a School of Law, a School of Commerce, and various other schools and colleges.

An interesting place to visit, yet one that is little frequented, is the Museo Nacional, which contains a number of magnificent specimens of the different minerals extracted from the mines of Bolivia, as well as some fine ethnographical exhibits : mummies, sculptures, and ceramics of the period of the Incas.

Although La Paz is not the official capital of Bolivia it is the capital *de facto* ; for, profiting by the faculty accorded them by the Constitution, the various succeeding Governments since the proclamation of Independence have moved to and fro between Sucre, the official capital, and La Paz, spending a few years in each of the two capitals. But as the population and commercial importance of La Paz have increased the visits of the Government have been prolonged, so that for the last twenty years and more La Paz has been the habitual seat of the administration.¹

VI. From the public, administrative, and economic point of view, La Paz is undeniably the chief of the Bolivian cities. Its population to-day numbers 82,000 to 84,000. According to the municipal census of 1909, whose details were published and commented upon by Señor L. S. Crespo, one of the leading writers and geographers of the country, the population was in that year 78,856 ; at the time of our previous visit it was barely 50,000, according

¹ The last disturbances which occurred in Bolivia in 1889 were caused by a decision of the President to transfer the Government to Sucre, which resulted in his fall.

to the contradictory and ill-founded figures which we were forced to consult. The only census deserving of credit, as it was serious and methodical in its execution, was that of 1909.

The total for 1909 includes 29,007 inhabitants of white race, or 10,823 more than in 1902 ; 24,515 cholos or half-breeds of various degrees (in 1902 this population numbered only 13,648) ; and 22,901 Indians of pure race, Aymaras or Quechuas, dwelling in the city or its suburbs. In 1902 there were 26,183 Indians ; unlike the other elements of the population, the Indians tend to diminish as the total population increases ; while the number of half-breeds naturally tends to multiply.

The increase of the population would be considerably more rapid if, thanks to the absolute lack of care and hygiene, the infant mortality among the Indians, despite the salubrity of the climate, did not reach a figure of 59 per 100 per annum.

The census of 1909 revealed one detail which is very surprising—namely, that more than 50 per cent. of the population are celibate. It would perhaps be more exact to say that the majority, especially among the natives and half-breeds, do not trouble to regularize their situation ; so that there are only some 250 to 280 marriages each year.

La Paz is gradually becoming a comparatively cosmopolitan city. According to the census already cited there were in 1909 3,357 foreigners, of whom 541 were women ; or an increase of 2,273 since 1902. The Peruvian colony is the most numerous, with 1,500 persons ; next comes the Chilian, with 410 ; then the German, with 246 ; the Spanish, with 196 ; the Italian, with 169 ; the French, with 154 ; the Argentine, with 127 ; the United States, with 86 ; and the English, with 76.

La Paz contains only 131 negroes and a dozen Chinese and Japanese.

From our own observations we should say that the foreign population living in the capital in 1912 was considerably more numerous than the above figures would lead one to suppose. At the time of our visit there were in the city numbers of engineers, capitalists, merchants, and manufacturers who had come to conclude business transactions or to study conditions on the spot ; to say nothing of professors, business employees, priests, nursing sisters, etc.

VII. The trade of La Paz is almost entirely in the hands of foreigners : Germans, French, and English as regards the wholesale trade. The Germans, whose colony is the most numerous, and almost entirely commercial, form about 60 per cent. of the business population ; then come a certain number of French, English, and Italian business houses. The Peruvians are retail traders and artisans ; the Italians retail traders and small manufacturers ; the English are mostly industrial promoters, managers, etc.

The commercial importance of La Paz has greatly increased of late years, above all since the prolongation of the Oruro Railway. Before the construction of the Antofagasta Railway almost all the trade of Bolivia was effected by way of Mollendo or Arica, by the long and painful route of the Incas ; this last, which had lost something of its former importance, will once more become the favourite route, since it is now doubled by the railway. As an industrial city La Paz is as yet of little significance ; however, there are now several prosperous undertakings of various kinds in the city, including distilleries, match factories (a Government monopoly or *régie*), liqueur distilleries, and factories of potted meats, cigars and cigarettes, soaps and candles ; a few potteries and tanneries, and a few good steam sawmills and joinery works, etc.

But the breweries have succeeded best. Capitalists, both native and foreign, have invested

considerable sums in the brewing industry, which, flourishing as it is, does not yet supply all the beer consumed by the country. Last year the Chamber of Deputies had to consider a proposed Bill which would have revised the import duties on foreign beers, but after examination the Bill was thrown out, and rightly so, for the beer made in the country is not at all bad, and the duties at present imposed do not prevent the sale of German beers, although they fetch rather high prices. The Cerveveria Colon, which is the most important of the breweries, possesses plant worth nearly £10,000 and a capital of £10,500 in materials and the finished product; the balance-sheet showed a figure of £28,570. The duties paid by the trade go towards the amortization of the internal tramway loan.

The manufactures of the city are estimated at £800,000 per annum. La Paz owes a good deal of its activity to the fertile valleys which surround it, and more especially to the Yungas, of which we shall speak later on.

Whether La Paz does or does not remain the actual capital of the country, nothing can now check its development. The advantage gained will be maintained whatever progress Sucre and Cochabamba may achieve with the aid of railway systems in course of construction or projection.

VIII. There are only a few hotels in La Paz—eight, to be precise—of a very inferior quality, where the charge is 2 to 4 Bolivians a day—3s. 4d. to 6s. 8d.—and one passable hostelry, the Hôtel Americano, where the tariff is 8s.; and one which for La Paz is really in the first class: the Grand Hôtel Guibert, managed by a Frenchman, which is situated at the corner of the Calle Comercio and the Plaza Murillo, with a huge annex in the same street. Although it certainly leaves a little to be desired in some respects, it is none the less the best hotel in

the Republic. The prices are as follows : room and board, 6 Bolivians (10s.) to 50 Bolivians (£4) per diem. The last figure refers to a flat or suite ; as a rule one can obtain a bedroom and even a sitting-room and board for 8 or 10 Bolivians. By agreement board alone without wines can be obtained for £5 12s. per month, or, if a little inferior in quality, for £4 16s.

Unfurnished rooms may be had in the *tambos* and inns which receive travellers of modest means, chiefly half-breeds and natives. Except in the inns, where food of a kind may be obtained at 10 centavos (2d.) per portion, there are very few decent restaurants in La Paz ; as a rule one resorts to the two hotels already mentioned. The city does boast of some thirty *cafés*, but only two of these can be recommended : that attached to the Hôtel Guibert and the Casino, in the Plaza Murillo, which possesses a fine cinematograph hall, which was inaugurated at the time of our visit.

A fact to be remembered is that in all establishments run by half-breeds or natives the foreigner may expect to be charged 50 and even 100 per cent. more than the usual prices, if he is not familiar with these.

As to family dwelling-houses : in the centre of the city rents will not be less than £16 a month ; in parts a little more remote they will be from £4 to £6 ; and in outlying streets or quarters a little more or less than £4.

There are few carriages in La Paz, owing to the steepness of the hills, but now that the trams are running those few suffice for the local requirements. For drives within the city the fare is 0·5 B. (9½d.) per person, and the same is charged for the drive from the railway station to the hotel. By the hour the tariff is 4 Bs. for the first hour and 2 Bs. (3s. 2½) for the second, 1 B. for the third, and 0·5 B. for



DISTANT VIEW OF ILLIMANI.



NEAR LA PAZ.

To face p. 60.

succeeding hours within the limits of the city. The tramway fares are 2d. and 4d.¹

Salaries and wages are very variable in La Paz. Special foreign artisans are paid comparatively high wages ; as a rule they are engaged in Europe or the Argentine ; apart from men so engaged few foreign workers are employed, as employers content themselves with half-breed or native labour, which is very much cheaper. The Swiss stonemasons already mentioned do not earn more than 9s. 7d. to 12s. daily. But ordinary labour is extremely cheap ; the Indians of both sexes, who are employed at the cathedral to carry away the rubbish in their cloaks, often to a considerable distance, earn only 6d. or 8d. a day. Prisoners condemned for vagabondage or petty delinquencies are also employed on public works, of course without wages. The amount of work accomplished by them is not remarkable.

The following figures give the average wages paid in 1912 :—

| | | | |
|-------------------|-----|-----|-----------------------------|
| Carpenters | ... | ... | 2s. 6d. to 3s. 4d. per diem |
| Masons | ... | ... | 2s. 6d. to 5s. " |
| Locksmiths | ... | ... | 3s. 4d. to 5s. 10d. " |
| Labourers | ... | ... | 1s. 4d. to 1s. 8d. " |
| Butlers | ... | ... | 16s. to £2 per month |
| Cooks, male | ... | ... | 16s. to £2 " |
| Cooks, female | ... | ... | 8s. to £1 " |
| Coachmen | ... | ... | £1 4s. to £4 " |
| Domestics | ... | ... | 16s. to £1 12s. " |
| Inferior servants | ... | ... | 7s. 8d. to 16s. " |

A few hints as to the prices of certain staple articles of consumption will not be superfluous. Living will be found somewhat expensive in La Paz, especially when imported articles are consumed.

Thus, a fowl costs 5s. ; a kilo of meat (about

¹ To be exact, 10 and 20 centavos.

2 $\frac{1}{4}$ lb.) 1s. 8d. ; a litre (about a pint and three-quarters) of milk 1s. 3d. ; a bottle of beer 10d. ; bread is 10d. per kilo ; petroleum 10d. a litre ; a load of potatoes of 220 lb. will cost £2 to £2 8s. ; flour is 14s. to 22s. per Spanish quintal of 112 lb. ; maize flour 32s. per load of 330 lb. ; a box of candles costs 16s. to £1 ; a pound of tea 3s. 4d. to 3s. 8d. ; a pound of biscuits 1s. ; sugar is £3 or £2 the chest of 1 cwt., according to quality ; condensed milk 32s. the chest ; rice 16s. to 20s. per cwt. ; soap 14s. to 16s. per chest ; stockfish £3 8s. per cwt. ; French cognac (Frapin's is much appreciated in La Paz) £2 10s. per dozen.

These prices were quoted in 1912 by the wholesale and retail merchants of La Paz ; as they do not greatly vary they may be taken as a guide in the drafting of a budget of expenditure.

CHAPTER IV

HISTORICAL AND GEOGRAPHICAL SKETCH

- I. Historical notes. The Incas and their empire.—II. The Spanish Conquest and domination.—III. The War of Independence and the Republic.—IV. Geographical notes. Area and situation.—V. The high table-land of Bolivia. Cold and temperate regions.—VI. Torrid regions.—VII. The great peaks of the Andes.—VIII. Hydrographical systems.—IX. Climate. Variations of temperature according to altitude.—X. The seasons ; the best time of year for travel in Bolivia.—XI. Sanitary conditions. *Soroche* or *puna* ; its effects. Paludism in the hot regions.—XII. Frontier problems.

I. UNTIL 1809, when the War of Independence broke out, the history of Bolivia was almost wholly confounded with that of Peru, the vice-kingdom of which it formed a portion, under the designation of Alto Peru or Audiencia de Charcas. In 1776 the latter territory was annexed to the vice-kingdom of Buenos Ayres, but in 1810, the latter having revolted against the rule of Spain, the province of Charcas was once more incorporated in the vice-kingdom of Lima.

Three very distinct periods characterize the history of Bolivia down to its constitution as an independent State. The first comprises the empire of the Incas, from 1054 to 1533 ; the second the Spanish conquest and domination, from 1533 to 1809 ; the third, the period of the War of Independence, from 1809 to 1825. A fourth period is

that of the Republic from its constitution to the present time.

It was in 1531 that Francisco Pizarro and Diego de Almagro, who between 1525 and 1528 had made several reconnaissances along the coast to the south of Panama, undertook the final conquest of what was later to be known as Peru and Bolivia. The conquerors found in the country a powerful civilization whose origins form a most difficult problem, the more so as the Spaniards, without troubling their heads as to the past of the people, so effectually destroyed a flourishing empire that, excepting the fate of the Aztecs, annihilated by the same people, there is not in the history of the world another such example of complete and rapid destruction.

The ruins of cities and colossal fortresses, of palaces, aqueducts, and paved highways demonstrate the state of prosperity attained by the Inca empire, whose foundation is attributed to the year 1054. As to the systems or dynasties which preceded it, we can only speculate. The native populations, which did not, we know, themselves belong to the race of the Incas, preserved the tradition of a prince, rich in virtues, Manco-Capac, and his spouse and sister Mama-Ocllo. They, according to a fiction doubtless promoted by the Incas, issued from one of the islands of Lake Titicaca, claiming to be "the children of the Sun." They taught the natives to cultivate the soil, to live in common, and to submit to the extremely wise laws which they promulgated; they also taught them to recognize the sun as a divinity, under the title of Pachacamac, and caused them to erect a temple to him, the ruins of which are to be seen to this day.

Having laid the foundations of the immense empire which he named Tahuantin-Suyo, of which Cuzco was the capital, Manco-Capac died in 1107, in the fifty-third year of his reign. Here is the

list of the Incas who succeeded him and the dates of their accession: Sinchi Rosa, 1107; Lloque Yupanqui, 1136; Mamaita Capac, 1171; Capac Yupanqui, 1211; Inca Roca, 1252; Yahuar Huacac, 1303; Viracocha Inca, 1323; Inca Urco, 1373; Pacha Cutec, 1423; Tupac-Yupanqui, 1453; Huayna-Capac, 1483; Huascar, 1525; Atahualpa, 1528.

The mighty empire constituted by the Incas occupied nearly a third part of South America. It stretched from the 2nd degree of north latitude to the 37th degree of south latitude, thus comprising in its vast area the modern Republics of Ecuador, Peru, and Bolivia, together with a great part of Colombia, Chile, and Argentina. The whole empire was 3,000 miles long and 300 miles wide, and was divided into four regions or nations, each of which was a kind of vice-kingdom, whose limits were not very exactly defined. These were Chincha-Suyo, in the north; Anti-Suyo, in the east; Colla-Suyo, in the south, and Cunti-Suyo, in the west. Modern Bolivia comprises a large portion of these two last divisions.

II. Huayna-Capac, the thirteenth Inca, took the whole northern portion of the empire from his eldest son, Huascar, and gave it to Atahualpa. At the close of a war between the two brothers Huascar was taken prisoner (he was afterwards drowned). This was the moment of the arrival of Pizarro and Almagro; they encountered Atahualpa at the head of his army not far from Cajamarca. Pizarro laid a trap for the Inca, who paid him a visit and was made a prisoner. Every one knows of the fabulous sum which he paid for his ransom; but despite that ransom the bloodthirsty conqueror had him strangled.¹ The Spaniards, with Almagro and Soto

¹ The room in which the Inca was imprisoned, which is still shown at Cajamarca, and which we inspected during a previous visit, is 22 feet long by 16 feet wide, and the mass of gold and silver

at their head, then marched upon Cuzco, which they entered after a desperate struggle.

This was the end of the Inca empire, although another child of the Sun, Toparca, was crowned Inca by the conquerors, who, not as yet feeling strong enough to stand alone, were thankful to shelter themselves behind the traditions of the country. This Inca died almost immediately ; he was replaced by Manco-Capac II, the brother of Huascar, who made praiseworthy efforts to reconquer his already disorganized empire, but was successively defeated by Pizarro and Almagro ; after which he retreated as far as Huillapampa, but was none the less assassinated by order of Almagro.

The Spanish domination was perpetuated under ten monarchs, from Charles V to Ferdinand VII (1810). It was a long and terrible oppression ; the native population was decimated by ill-treatment and forced labour in the mines ; the exploitation of the mines was the only industry which the Spanish were willing to promote ; and the number of natives who must have perished during the Colonial period to satisfy the cupidity of the conquerors and the metropolitan State is estimated at eight millions.

The influence of the Spanish colonial policy, tyrannical and exclusive as it was, and inspired by the narrowest egoism, was here, as everywhere, as disastrous to the general progress of the country as to the individual interests of the creole or half-breed inhabitants. All favours were reserved for Spaniards, who had been sent out from the mother-country to profit by some tax, monopoly, or privilege ; and as early as the eighteenth century history begins to record acts of rebellion against the metropolitan authorities. In 1780 the natives, terribly oppressed, rose and began a war of extermination

which formed the ransom had to extend as high as the hand could reach : say 7 feet 6 inches.

against the Spaniards, under the leadership of Tupac-Amaru II, a descendant of the Incas ; a war which was terminated by the barbarous execution of the chief and his family. But it was not until 1809 that a general movement of the populations of Upper Peru to conquer their independence was inaugurated.

III. For more than fifteen years the country was the theatre of a desperate and bloody war ; it ended only in 1825, after the battle of Tumusla, when the armies which had been recruited in Colombia, under the command of Bolivar, routed the Spanish army at Junin. The independence of Bolivia dates from the battle of Ayacucho, which was won, toward the end of the year 1824, by General Sucre, Bolivar's lieutenant, and that of Tumusla, won in April, 1825. It was in gratitude to the liberator of a great part of South America that the Republic took the name of Bolivar, later changed to Bolivia, and for similar reasons the Congress which met at Potosi on the 6th of August, 1825, decided to give the name of Sucre to the capital of the new State.

From the Proclamation of Independence in 1825 to the year 1913 Bolivia knew seventy-one Presidents, more or less provisional or constitutional, or Governments entrusted with the executive power. Like all the young Spanish-American States, Bolivia has suffered many *pronunciamientos* and several internal revolutions. These latter were not incessant, as the history we learn from comic operas would incline us to believe ; and in any case we must not criticize Bolivia too severely on account of these bygone convulsions ; we should remember that this nation, full of force and vitality, was, like her sister Republics, born prematurely into autonomous existence, without education or preparation of any kind for republican institutions, that she had to struggle for stability, and has hardly now traversed this preparatory period.

These shocks were less harmful to the prosperity of Bolivia than the disastrous Pacific War, which lasted from 1879 to 1883, into which Bolivia was drawn by Peru in her campaign against Chile. We know that the latter, to the detriment of the two other countries, seized upon the coastal territory which she coveted. We know, too, that since 1898 the Governments of Bolivia have succeeded one another conformably to the Constitution and in perfect tranquillity.

IV. Bolivia, whose present area is 530,000 square miles,¹ forms a parallelogram extending over 13 degrees from north to south and a little over 10 degrees from east to west. At the moment of the Declaration of Independence the country had an area of nearly 1,155,000 square miles, but as a result of treaties and conventions concluded with Brazil (in 1867 and 1903), the Argentine (in 1889), Chile (in 1866-74 and 1904), and Peru (in 1909) its territory has been reduced to its present extent. By the treaty of 1867 alone Bolivia ceded to Brazil no less than 59,138 square miles, and 5,680 square miles to Chile in 1866 and 1874, without speaking of the final cession of the coast, concluded in 1904, and that of the territory of Acre to Brazil in 1903.

The two last treaties, which might seem unfavourable to Bolivia in the sense that they deprived her of a great extent of her territory, were really the beginning of an economic revival, and the development of her railways. The completion of the great line across the high table-land, which may be regarded as the artery from which the future railway system of Bolivia will ramify, was, with various branch lines, really built by means of the indemnities secured by these treaties. Brazil and Chile also engaged them-

¹ Calculated ; the country has never been subjected to a thorough scientific survey. Official documents give the area as 597,460 square miles.

selves to construct at their own cost two important railways ; one the Madeira-Mamoré line, which evades the terrible falls and rapids of the Rio Madeira, thus affording an easier and less costly outlet to the natural products, particularly the rubber, of Eastern Bolivia, and the other the line running from the port of Arica to Viacha and La Paz. These engagements have been faithfully observed, for the two lines have just been completed.

Withdrawn behind the Cordillera, Bolivia is limited on the north-west by Peru, and on the north and east by the vast and as yet scantily populated territories of Brazil and Paraguay, while on the south the Republic abuts on the Argentine provinces, running southward as far as the Gran Chaco, of which a goodly portion is Bolivian. On the west it is bounded by the western Cordillera, between which and the Pacific stretches a barren, naked, unpopulated region, which is, however, rich in deposits of nitrate of sodium, from which Chile draws the greater part of its revenue.

V. The natural configuration of Bolivia permits of its division into two regions, distinct as to climate, products, and topography. As regards climate, indeed, we may distinguish three different regions : the cold, the temperate, and the torrid.

The first of these is the mountainous region, comprised between the slopes of the outer Cordillera and those of the Royal Andes ; it is traversed by a number of ranges perpendicular to these great systems, and forming a number of valleys which are separated one from another by ramparts running to an altitude of 2,600 feet. This region, which begins about eighty-seven miles from the coast, includes the range of the Andes and the high table-land. The latter, which maintains an almost constant altitude of about 12,400 feet, has a length of about 465 miles and a width of about 120. The two vast plains which form

this plateau, and are slightly inclined toward one another, are extremely arid, and the crops fail if the rains are scanty. Between them flows the Rio Desaguadero, some 250 miles long, and of an average width of forty yards, which unites Lake Titicaca in the north to Lake Poopo in the south of the plateau.

This mountainous region is divided into two portions: the first is the cold region, known as *puna* or *puna brava*, whose altitude varies from 10,000 to 15,000 feet, at which height lies the line of perpetual snow. This region possesses a special though scanty vegetation and a yellowish turf. The second is the temperate region of the valleys (*cabecera* and *valle*), or the *sierra*, and is comprised between the heights of 9,000 and 5,500 feet. This region is remarkable for its mild temperature and the abundance, beauty, and variety of its vegetation. From 7,500 feet and downwards it is known as the region of the valleys; the atmosphere is agreeable, but one begins to notice traces of the humidity of the forests, which are not very distant. It is in the heart of this region of mountains and valleys that the principal cities of the country are found, and it is the true centre of the Bolivian population.

VI. The third or torrid region runs from a height of 5,500 feet on the slopes of the eastern Cordillera, and stretches away in magnificent and marvellously fertile plains to the frontiers of Paraguay and Brazil. This is the region in which Nature has shown herself most prodigal; it comprises also a district known as the Yungas, lying between 2,500 and 5,500 feet above sea-level. The *yungas* are the hot valleys which lie between the spurs of the Andes—at the foot of Illimani, to the north and north-east, where the influence of the Equator is strongly sensible. As we penetrate this region the vegetation increases at every step, acquiring larger proportions and greater splendour; and the multiplicity of the flora increases

until we reach the virgin forests which cover the entire basin of the Amazon and its affluents.

In the south and south-east there are vast grassy plains ; and this pasture-land extends to the east, until it changes, little by little, into the forest country which extends to the Paraguayan frontier.

The *yungas* and the warm valleys are covered with a vegetable mould of astonishing fertility ; a secular accumulation of organic detritus in which everything grows abundantly. Here are grown Bolivia's crops of coca, cocoa, sugar-cane, coffee, quinquina, and rubber ; here are found the precious gums and resins consumed by the cabinet-maker, and all the vegetable wealth of the equatorial zone ; here, too, cereals prosper in suitable localities ; and here also are vast stretches of pasturage. Unhappily, this portion of Bolivia is as little known and exploited as the neighbouring portions of Brazil and Peru ; and the same is true of the vast plains of the south-east, which might support innumerable herds of cattle.

It is superfluous to give a complete account of the orography of Bolivia. The Cordillera presents two distinct systems along its whole extent ; the western slope, which follows a direction parallel to the Pacific coast, is abrupt, with steep and rugged slopes, and vegetation is rare or non-existent. The eastern slope, on the other hand, descends gradually, and shelters many fertile valleys before it sinks into the eastern plains.

VII. At their point of first separation the two ranges consist of mountainous lands of no great altitude. The highest summits of the outer range follow the configuration of the Pacific coast, commencing between the 17th and 19th degrees of south latitude. The two ranges, inner and outer, include many volcanoes, extinct and active, and a certain number of *abras* or passes, of which even the lowest is nearly 13,000 feet above sea-level.

The highest peaks of the Royal Cordillera are : Illampu or Sorata, which according to Pentland is 25,242 feet in height, but according to later figures, 21,533 ; Illimani, the mountainous bulk of the Sorata range, which, according to the same surveyor, is 24,849 feet in height, and, according to later figures, 22,581 ; Cololo, 22,338 feet ; Catantica, 20,992 feet ; Parinacota, 20,913 feet ; Pomarapi, 20,434 feet ; Huayna Potosi, 20,289 feet ; Mairaruta, 20,286 feet, etc. Among the volcanoes we may mention Sajama, 21,041 feet in height, and San Pedro, 18,123 feet ;¹ the latter is among the active volcanoes, and a number of others emit a slight stream of vapour.

VIII. The range of the Andes forms the line of division between these waters of the Bolivian territory which flow into the Atlantic and those which flow into the Pacific, constituting three distinct hydrographic regions. The first, that of the Pacific, is relatively insignificant, as it contains only small rivers like the Saldo, the Paposo, the Loa, and the Desaguadero, which do not belong to any of the three watersheds. The eastern region is divided into two watersheds, that of the Amazon to the north and that of the Rio de la Plata to the south. The Pilcomayo, which belongs to this latter system, together with the Bermejo, which consists of three principal branches, the Cahimayo, the Pilaya or Camblaya, and the Tumusla, crosses the Gran Chaco before flowing into the Paraguay ; while the Bermejo, an affluent of the same, owes its origin to the Rios Tarija, Oran, Condado, and San Luis, to name the chief among many.

The rivers of the Amazonic system are more numerous, and some are of great importance : such

¹ It is not easy to assign the mountains of Bolivia their true rank among the heights of the Andes, as the determined heights present many discrepancies.

as the Beni, the Guaporé or Itenez, and the Mamoré, which is formed of several affluents, and crosses the vast plain of the Mojos. These three great rivers form the Rio Maderia. Many other tributaries flow into these rivers ; among them the Mapiri, the Madre de Dios, the Orton, the Acre, and the Abuna, and a multitude of others which flow through the neighbouring regions of Peru and Brazil. The Beni, Mamoré, and Guaporé, to cite only the largest, are so many great highways which at no distant date will bear to the Atlantic the unexploited wealth of this portion of the American continent.

IX. Although it lies in the torrid zone, Bolivia, with the exception of a portion of the southern region, possesses a most variable climate, on account of its system of mountains. We find several great climatic zones, perfectly characterized, which correspond to various altitudes. In the cold and temperate zones we note great and sudden changes between the temperature of the day and that of the night ; and as we ascend they are greater and more frequent. A fall of one degree is noted for every 600 feet of additional elevation. It is not rare to see the mercury move, in a few hours, through twenty to thirty degrees in the valleys, and fourteen to twenty-seven degrees in the neighbourhood of the Cordillera. The maximum temperature covered at La Paz is 77° F. The diurnal temperature of the high table-land is maintained without much variation throughout the year ; in the winter the thermometer descends a little below freezing-point ; the cold is more extreme during the night, but during the daytime the sunlight makes it almost hot except in the shade. During the winter the high table-land is swept by violent gales, and hailstorms are by no means rare.

In the valleys known as *yungas*, and in the region of the plains and forests of the north and north-east,

the cold of winter is unknown. Really there are only two seasons in these parts ; the summer, or rainy season, lasting from December to May, and the winter, or dry season, lasting from June to November. When the rains have been scanty the heat is very great, but even during the dry season it rains frequently in the wooded belts. These dry and rainy seasons are not the same for all portions of the torrid region, but are affected by various circumstances.

X. On the high table-lands, on the other hand, we can distinguish four seasons, or astronomical divisions of the year, which are in inverse order as compared with those of Europe. Spring, which begins in August and ends in October, is marked by gales of wind and a moderate temperature. Summer may be divided into two periods : the first dry and burning, the second rainy ; during the months of November and December the heat is severe even at an altitude of 12,000 feet ; the atmosphere is charged with electricity, and showers, accompanied by squalls, fall in the afternoon, while hail is not unknown. The second period comprises January and February ; the temperature is cool on rainy days, the sky is covered with low-lying clouds, the rain is fairly constant, and the rivers grow considerably fuller ; this is the season at which fruits ripen. Sometimes the rains cease at the beginning of March ; sometimes they continue until the end of that month. In the torrid region the rains are torrential and last for six months.

Autumn, the season of gentle heat, lasts only through March and April. The months of May, June, and July constitute the winter, during which the temperature is low, the wind glacial, and the frost continuous. Snow falls irregularly during these three months, accompanied by squalls of wind. The limpidity of the atmosphere during this season is most remarkable, so that the most distant objects

appear close at hand. May is the season for gathering the crops of potatoes and other roots, and of cereals and grain of every kind.

It is during the dry season, which includes the autumn, the winter, and part of the spring—in other words, it lasts from April to November—that travel in the interior of Bolivia is most practicable, the best months of all for the traveller being May and June. The summer proper is the least favourable period, as the streams and torrents are full with the rains, and difficult to ford, while the roads, which are bad at any time, are then almost impassable except to mules.

XI. On the whole there are no maladies endemic to Bolivia, and no positively unhealthy regions. Travellers who reach Bolivia by way of the high table-lands and who make any stay in high altitudes feel the effects of mountain-sickness, locally known as *soroche* or *puna*, which is caused by the deficiency of oxygen in the rarefied air. It is above 10,000 feet that one becomes liable to this complaint. With some the symptoms go as far as bleeding at the nose, suffocation, and syncope ; but such cases are very rare, and we ourselves never saw any serious cases.

As a rule the symptoms are limited to oppression, headache, fatigue, and a feeling of vertigo, while at night the traveller suffers from insomnia, accompanied by a great lucidity of mind. At other times, especially during the first few days of acclimatization, or while travelling at altitudes above 13,000 feet, there may be fever, exhaustion, lack of appetite, and throbbing in the temples, and the ears are full of the sound of hurrying blood, the pulse beating at a rate of 130 to the minute or more, as though one had just been running a great distance. But all these symptoms are more or less pronounced according to the constitution, and there is no danger unless

the heart or lungs are weak or diseased. The diminution of atmospheric pressure naturally leads to more rapid respiration, as to compensate for the tenuity of oxygen one has to pass more air through the lungs, so that their action and that of the heart is accelerated.

At the end of a few days the external and internal pressures become equalized and the discomfort ceases ; there is an inevitable period of acclimatization, which lasts from a few weeks to several months according to one's temperament ; but few can ever walk rapidly or take violent exercise without fatigue or breathlessness. Both foreigners and natives returning from the coast feel this sickness in varying degrees, and each treats it with his own pet remedy : some take *sal volatile*, and a cachet of hydrochlorate of cocaine and antipyrine may be recommended. But every railway train ought on principle to carry a bag or cylinder of oxygen in case some traveller with a weak heart should be attacked by syncope.

As will be seen, *soroche* is not a malady, but a passing *malaise* of no great gravity ; on the whole the Bolivian climate on the high table-lands and the plains of the south-east is perfectly healthy ; and although intermittent fevers are common in the *yungas* and the hot valleys, they are prevalent only in the summer, and are not of a malignant type. Paludian fever is found in the whole of the Beni region, and in the forest belt watered by the affluents of the Amazon ; it more especially attacks the inhabitants, who do not observe the elementary laws of hygiene, and whose diet is poor and insufficient. Fevers are rare in the dry season, commencing only with the rains, their severity varying according to the district and the altitude. In the chapter dealing with the Territory of Colonias we shall speak of the hygienic conditions of the various regions and the rules to be observed for the avoidance of paludism.

XII. On breaking the bonds that bound them to the mother-country the South American Republics, constituted as independent States, adopted as the basis of their territorial divisions the frontiers which already existed between the vice-kingdoms or colonial territories of Spain. This natural and tacit agreement is known as the *uti possidetis* of 1810. But as the frontiers of these divisions were notoriously never precisely determined, but established merely by calculation and with the aid of maps, they were never more than approximate. Consequently, when one of these countries, until then ignored or despised, revealed itself as the home of abundant mineral or natural wealth, there were naturally disputes between adjoining States.

Less than any has Bolivia escaped such difficulties, and enormous territories were claimed from her by Chile, Brazil, Peru, the Argentine, and Paraguay. In the case of the two first-named countries the frontiers were finally delimited by the agreements of 1903 and 1904. Disputes are still pending with other countries; at one time the differences with Peru were so serious that a war nearly resulted. An agreement was concluded in 1909, and at the present moment a commission of French officers is preparing a chart of the frontier on the spot, in view of a fresh agreement. A mixed commission is also working at the delimitation of the frontier between Bolivia and the Argentine. There is still a controversy on the subject of a portion of the Chaco, which Paraguay has occupied, profiting first by the indifference of those concerned, and then by the distance which divides this region from the heart of Bolivia. The Pilcomayo would seem to be the natural frontier of Bolivia as far as its embouchure, but hitherto the Republic has not put forward any very energetic claim to the country.

CHAPTER V

POLITICAL, ADMINISTRATIVE, AND SOCIAL ORGANIZATION

- I. The political constitution of Bolivia. Deputies and Senators.—
- II. The Executive. The ruling President and his successor.—
- III. The Ministries. Señor Claudio Pinilla.—
- IV. Courts and civil jurisdiction.—
- V. Legal status of foreigners.—
- VI. Territorial divisions. The eight Bolivian Departments. The hierarchical order of the towns.—
- VII. Provincial authorities. Subordinate officials; *caciques* and *ilacatas*, vestiges of the period of the Incas. Insufficiency of the administrative staff.—
- VIII. Defects of the municipal administration. Improper tendencies of the municipalities. Little States within the State.—
- IX. Bolivian politics. Electoral methods. Influence of the Executive.

I. BOLIVIA is governed according to the democratic system of representation. It unites the three powers : the legislative, executive, and judicial. The legislative power consists of a Congress, which is composed of a Senate and a Chamber of Deputies.

The Senate consists of sixteen members only ; two for each department. The senators, whose mandate is for six years, are elected directly by the people, and are replaced at the rate of one-third every second year. The senators draw a monthly salary of 500 Bolivians (1,000 francs or £40) ; but this is only during the three or four months of the legislative session. They also receive an allowance of 8d. per mile for travelling expenses. The number of sittings is usually sixty, but there may be as

many as ninety. The Chambers are constituted on the 6th of August each year. The conditions of eligibility to the Senate are as follows : the senator must be at least thirty-five years of age and must possess an annual income of at least £32.

The Chamber of Deputies consists of sixty-nine members, elected for four years. The Chamber is renewed at the rate of half the Chamber every second year. Senators and deputies are re-eligible ; and the deputies draw the same salary as the senators. A deputy must be at least twenty-five years of age and possess an income of at least £16. The two Chambers must always sit simultaneously.

II. The executive power is exercised by a President and two Vice-Presidents, who are directly elected by the people for four years, and cannot be re-elected until an equal period has elapsed. In case of death or disability the President is replaced by the first Vice-President, or in default of him by the second. The first Vice-President is *ex officio* President of the Senate and of Congress. The salary of the President is quite democratic in its dimensions : it amounts only to £2,400, to which is added £960 for expenses. The two Vice-Presidents receive £800 and £640 per annum respectively.

The outgoing President, Señor Eliodoro Villazon, entered upon his functions on the 6th of August, 1909, and retired upon the same day in the year 1913. Señor Villazon has paid several visits to Europe, either to study finance and commercial legislation or as financial agent, and has in his time filled the highest posts. Jurisconsult, diplomatist, and administrator by turns, he filled all these positions in a manner beyond criticism. A prudent statesman, he has given much attention to public affairs, and especially to questions relating to the mining industry. He was in all things the worthy successor of Dr. Montes, whose administration was

one of the most favourable as regards the prosperity of Bolivia. We have already stated our opinion of this energetic statesman ; he is a man of superior intelligence, with a clear perception of the needs of his country, allied to an exact conception of his duties, whom the Liberal party of Bolivia has once again raised to the presidency of the Republic.

III. The President is supported by six Ministers or Secretaries of State, who hold the following portfolios : Foreign Affairs and Public Worship, Government and Patronage (corresponding to a Minister of the Interior), Public Instruction, Finances, Agriculture, Justice, Industry, War, and Colonization.

One of the most remarkable politicians of Bolivia, a man of conspicuous personal talents, is Señor Claudio Pinilla, a sympathetic and admirable figure ; one of those public men who have notably contributed to the happy awakening of his country. A distinguished writer, a diplomatist by profession, Señor Pinilla brilliantly commenced his career by fulfilling the painful duty of representing his country in Chile after the Pacific War. After a journey through Europe he was sent to Brazil to uphold the rights of Bolivia in the territory of Acre. His mission terminated, he was called to the Ministry of Foreign Affairs, which he quitted only a few months ago, in order to accept the portfolio of the Interior and Finances. It is to the perseverance and diplomatic activity of this statesman that Bolivia owes the settlement of its frontier disputes with its neighbours.

IV. It will be well to say a few words here of the judicial power. It is exercised by the following courts or judicial bodies : 1. The Supreme Court of Justice, which is established at Sucre, the administrative capital of the Republic ; it consists of seven members, elected for ten years by the Chamber of Deputies, and re-eligible. This court pronounces



LAKE TITICACA—REED BOATS AND THE S.S. *INCA*.



THE DESAGUADERO (EFFLUENCE) OF LAKE TITICACA.

To face p. 80.

upon appeals against the judgments of first instance delivered by the District Courts. 2. The District Courts. Each capital of a department, excepting El Beni, is the seat of one of these courts, which are composed of five members, elected for six years by the Senate, and re-eligible. These courts, which are also known as the Superior Courts, are available as Courts of Appeal, dealing with the judgments of the Partido judges. 3. The Partido or district judges pronounce written judgments of the first instance in cases which deal with values of £40 and more. They may sit as judges of appeal in cases which have been tried in the first instance before the judges of instruction, and may hear pleas of nullity or appeal when these latter have delivered judgment in the second instance. 4. The judges of instruction or examining magistrates are appointed, like those of the Supreme Court, on the nomination of the District Courts; they hear causes of the first instance, delivering verbal judgments if the value concerned is less than £16 and written judgments if it is between £16 and £40. Finally, there are the parish magistrates or mayors (*jueces* or *alcaldes parroquiales*), appointed for one year by the Municipal Councils on the nomination of the examining magistrates; they hear causes of personal action and causes not involving a greater sum or value than £8.

V. Bolivia possesses an extremely liberal Constitution, which is based on the Constitutions of France and the United States; it comprises all the individual safeguards and rights common to all republican Constitutions. Any person has the right to enter the Republic, to move within it, and to leave it, also to exercise any trade or industry, without other restrictions than those established by international law. Travellers need produce neither documents nor proofs of identity; which does not mean that it is wise to be without papers of this kind.

By the way, we could never quite see the utility of the officials who, on the trains running to La Paz, ask the traveller's name and enter it in their notebooks, but without asking any further questions.

Considering that foreigners enjoy the utmost liberty in Bolivia, and enjoy all the rights and franchises accorded to Bolivian citizens, there are as yet only too few in the country; a regrettable fact from the Bolivian point of view, since by their presence and efforts they contribute to the general welfare of the country. The liberty of expression of religious and political ideas is unrestricted; although the State recognizes and supports the Roman Catholic religion, the public exercise of any other form of worship is permitted. Foreigners pay the same taxes as the Bolivians, but are not subjected to military service. They acquire civil and political rights after a year's residence if they will declare, before the municipality of the town in which they reside, their intention to settle in the country. They may then be appointed councillors, merely on the grounds that they are citizens of the district. At the end of the second year they may ask the Chamber of Deputies for a certificate of naturalization. Thus naturalized, after a residence of five years in Bolivia, any foreigner may be appointed general or commander in the army, senator, deputy, minister, prefect, member of a court of justice, etc.

The liberal professions can only be exercised by those who have proved their competence by examination, unless, indeed, there is a treaty extant between Bolivia and the aspirant's native country relative to the equivalence of degrees and qualifications.

VI. Bolivia is divided politically into one Territory of Colonias and eight departments, which form sixty-three provinces. This system of nomenclature, dissimilar to that usual in Europe and

America, is at first apt to lead to a certain confusion of ideas in respect of the relative territorial importance of these divisions. The sixty-three provinces are themselves divided into eighty-eight judicial sections, 378 cantons, and 240 vice-cantons. Here, counting from north to south, and along the parallels of latitude from west to east, are the names of the eight departments (the Territory of Colonias lies in the north of Bolivia) :—

La Paz and El Beni ; Oruro, Cochabamba, and Santa Cruz ; Potosi and Chuquisaca ; and, finally, Tarija, with its dependent Territory of the Gran Chaco.

Here are the figures relating to the area and population of the Departments, according to the census of 1900 :—

| Departments. | | | | Area (square miles). | Population. |
|-----------------------------|-----|-----|-----|-------------------------|---------------------|
| Chuquisaca | ... | ... | ... | 37,195 | 291,150 |
| La Paz | ... | ... | ... | 72,290 | 367,550 |
| Cochabamba | ... | ... | ... | 35,559 | 367,160 |
| Potosi | ... | ... | ... | 57,354 | 351,610 |
| Oruro | ... | ... | ... | 27,460 | 135,540 |
| Santa Cruz | ... | ... | ... | 140,735 | 235,320 |
| El Beni | ... | ... | ... | 102,215 | 36,042 |
| Tarija | ... | ... | ... | 70,068 | 115,223 |
| Territory of Colonias | ... | ... | ... | 60,830 | 20,000 |
| Territory of the Gran Chaco | ... | ... | ... | 60,830 | 20,000 ¹ |

With the exception of Chuquisaca, whose chief town is also the capital of the Republic, Sucre, El Beni, whose chief town is Trinidad, and Santa Cruz,

¹ These figures are given provisionally and are purely an approximation, for there have been few census-takings save in the chief towns, and those that have been effected have certainly been imperfect. The natives do not take kindly to the census, fearing that it precedes fresh taxation. Some of these figures may be greater and some less than the reality. Again, even according to the best official documents the superficial area of the country is given as 597,459 square miles and also as 532,920 square miles.

whose chief town is known as Santa Cruz de la Sierra, all these departments bear the name of their capitals. The territories have not as yet well-determined capitals.

The hierarchical order of the centres of population in Bolivia is as follows : *Villa*, or city ; small city, township, or borough ; canton ; vice-canton, corresponding to villages of varying importance ; and the *Aldea* or *Estancia* (a great rural property). There is also the Mission, a centre in which a varying number of Indians are united in a colony under the authority of a missionary father.

According to a recent Presidential decree, the towns of Bolivia, to merit the name of *villa*, or city, should have a population of at least 10,000 inhabitants, and primary schools frequented by at least 500 pupils. This decree does not affect those cities and towns which were classified before its publication ; but it gives the rank of city to all departmental capitals.

VII. Each department is under the direct authority of a prefect, and all its public officials are under his orders. Prefects are appointed for four years by the President of the Republic. In each province there is a sub-prefect, subordinate to the prefect, and, like him, appointed by the President for a term of four years. Each canton has over it a *corregidor*, appointed yearly by the prefect ; in the vice-cantons authority is represented only by an *alcalde territorial* or *de campo* (a sort of mayor).

In reality the subordinate administrative staff in the provinces is a heterogeneous body alien to the true political organism of Bolivia. It includes *caciques* or *caracas* (sometimes called *mallcu*) and *ilicatas*, who are relics of the Inca empire ; and the *alcaldes* and registrars (*regidores*), who are relics of the Colonial period. The *corregidor* is the sole legal functionary, but he is in fact surpassed

in authority and prestige by the *cacique* or *curaca*, who, thanks to the traditional character of his authority in the eyes of the natives, has the greatest influence over them and easily rules them. This ancient system of administrative organization provides a practical though illegal basis for the administration of the native communities; hence the necessity of a prudent tolerance, in spite of the discretionary power which the *cacique* assumes, in order to protect the communities dependent upon him in all such matters as the revision of titles or assessments, often addressing himself directly to the Chambers without the intervention of the executive.

The *corregidores*, who are generally half-breeds or natives, of little or no education, although there are a certain number of honourable examples, exercise their authority with all the faults and abuses which characterize the majority of the cantonal officials. Far from constituting a guarantee for these centres of population, they demoralize them, using their authority for their own profit. The causes of this state of affairs may be found in the uneducated condition of the inhabitants of these small communities, the influence of ethnical elements, which prevail in the interior, and the ignorance of the natives and half-breeds, who carefully eliminate all factors alien to their caste, or attempt to assimilate them to their narrow and egotistical customs.

VIII. The municipality, favoured by the ample guarantees which the Government accords it, is gradually developing in harmony with the other institutions of government. But the municipal councils and assemblies at present organized in the Republic work with varying regularity according to the varying patriotism of the members composing them. Although one must admit that there are many municipalities distinguished for their civic qualities

and their activity, there are also more which display inertia and indifference, and, what is even more serious, irregularities in the handling of their funds. The ideals of civic virtue and public interest are not as yet very firmly rooted in the mind of the populace, and as the popular education is also defective, one rarely encounters an assembly responding to one's idea of what a municipality should be.

Election as member of a municipal council or assembly is usually a matter of *amour-propre*; once ambition is satisfied it relapses into indifference, which exempts the councillor from his duties, or permits him an improper licence. Under certain circumstances the mandate becomes a means of exaction, the humblest classes of society being the victims. So often is this the case that in each of his recent messages the President has inveighed against this state of affairs. In his bitterness he even betrays his conviction that the municipal assemblies are doomed to ineffectuality, adding that their creation has only had the result of burdening the people with supplementary taxes which are imposed upon articles of prime necessity, for it is such articles, together with the smaller industries, which furnish the Juntas with the elements of an anæmic existence which is often more harmful than otherwise.

The attention of the Chambers has also been called to the frequent conflicts which have arisen between the Government and the municipalities of the principal cities, which regard themselves as autonomous and form a real power within the Republic; whereas they are, of course, according to the Constitution, administrative corporations intended to watch over local interests, and therefore possessed only of limited attributes. These conflicts with the Government arise mostly from the persistent tendency of the larger municipalities to impose taxes which directly affect the revenues of the nation or the

department. They have even gone so far as to burden exports and imports with taxes, to the detriment of the commercial expansion of the country. These facts are notorious, and many articles of consumption coming from abroad are burdened with municipal dues, and it is not unusual to find, in certain of the custom-houses, a municipal agent whose duty it is to collect such taxes.¹

From the political point of view each department, or rather each large municipality, especially of those that are not yet served by the railway, is like a little State within the State. This decentralization, which is uncontrolled or difficult of control, adds greatly to the problems of government, and creates many obstacles to the conduct of affairs. This situation will gradually improve, as with the advent of the new railways the authority of the Government will be able to make itself more strongly felt at a distance ; and when, thanks to the spread of education, the coloured populations at last attain a consciousness of their duties, display a little more patriotism, and enter with increasing interest into public affairs. The present situation shows what difficulties the country has had to surmount in order to accomplish any progress, and against what a handicap it must have struggled had the new Constitution adopted the federal system.

IX. There is little to be said of Bolivian politics, as the parties have in general little or no influence. The elections of deputies and senators, and more especially the presidential elections, go forward in peace and quiet, electors limiting them-

¹ The departmental revenues are derived chiefly from the native land tax, the rural property tax, the tax on the exportation and importation of cattle, taxes on tobacco, indirect inheritances and legacies, tithes or dimes, and stamped papers for titles, etc. The departmental expenses are principally absorbed by the administration and the judiciary, education, public works, police and religion.

selves to somewhat platonic protestations against intrigues and equivocal combinations. The Government contents itself on principle with taking the necessary measures for the preservation of order and liberty of the voting.

Irregularities are not lacking in many electoral districts, particularly those which are remote from the seat of government. The polling officers act with remarkable partiality, attempting to prevent access to the poll or refusing the qualification under different pretexts ; seeking to diminish the vote or amplify it, as the case may be, in order to favour the party or personality of their choice. It is said that the orders of the Government are inoperative, owing to the lack of a good police force and the absence of troops. However, we doubt the efficacy of such means.

But we must not demand of Bolivian politics a loyalty, sincerity, and impeccable integrity which are far to seek even in such great European countries as are perfectly conscious of their power and of the laws of political morality, and which profess to stand at the head of the nations.

As those Bolivians, half-breeds and others, who possess some education have formed the bad habit of expecting everything from the assistance and goodwill of the State, the complaint has been made, and not without foundation, that the members of Parliament are mostly lawyers, with an enormous *clientèle* of half-breeds, and that they are good at one thing only—namely, at flattering the appetite and the base instincts of the mob.

X. In Bolivia, as in other South American States, the executive has absorbed the other powers of the State, often with very happy results, so that the populace confounds the person of the President with the very idea of government.

The President endeavours to bring his influence

to bear on the various electoral groups, and these latter endeavour to influence the mass of the voters—we will not say of electors—and direct them according to the will of the President. As we have seen, arrangements are made that the registers shall contain only the names of a majority of electors whose interest it is to support authority, and those candidates who are known to be in favour of this or that presidential candidate.

But there are non-official candidates, who are even hostile to the Government, but who, on account of personal worth or influence, come forward at elections. Then, owing to the indifference of the majority towards the public welfare, and in default of official support, they are forced to resort to that most excellent councillor, a sum of money intelligently distributed. Rarely does the Government seek to invalidate the adversary thus elected; for it is just as well that there should be a few protesting voices among the compact majority.

The Bolivian Parliament might be divided into two very unequal groups: that which blindly supports the Government—at present the Liberal party—and that which systematically opposes it. Sometimes a third party is formed, unremarkable in size and influence, more with the idea of making itself felt in some future Parliament than for immediate action.

The electoral procedures enumerated above do not in these new countries produce very bad results, for whenever the masses have been left to their own free will they have profited thereby to commit regrettable mistakes. In any case Bolivia can congratulate itself on the methods of government employed since 1898. An understanding between the President then outgoing and his successor resulted in this appreciable advantage, that the new Government is not undoing what its predecessor did, but,

on the contrary, is continuing its essentially patriotic programme.

Bolivia suffers from no lack of able men and enlightened leaders ; a country which has produced such remarkable sons, of such superior mental capacity, as Santa Cruz, Olaneta, Linares, Ballivian, and Baptista, to cite only these, can count upon her modern statesmen, who have indeed already given proof of their quality. Despite the faulty educational system, whose results cannot as yet be modified to advantage, despite the atmosphere of hostility which often surrounds those who rise from the midst of an ignorant and brutal people, such men, we must hope, will continue the work of transformation of which the generations to come, who will be better instructed, will feel the benefit.

CHAPTER VI

PUBLIC INSTRUCTION. THE ARMY

- I. Different departments of education.—II. The Universities ; too numerous and incomplete. Their organization.—III. Probable reduction of their numbers.—IV. The development of secondary education. The Normal Schools ; the School of Commerce. Foreign professors.—V. Technical education. Plans for the future.—VI. A vital question : the education of natives. Why progress is slow.—VII. A happy experiment : the Normal College for Teachers in Native Schools.—VIII. The modern Bolivian Army ; how composed and distributed.—IX. Compulsory military service. Insubordination among the cultivated classes.—X. The weakness of the public authorities in respect of insubordination. The beneficent influence of service upon the Indian. The condition of the soldier.—XI. The German Military Mission.—XII. French Missions in America.

I. PUBLIC education has long been neglected in Bolivia, and is still far from being as general as it is in the neighbouring republics, notably in Chile and the Argentine. Until a recent period Bolivia was among those countries which expended least upon public education. During recent Ministries—those of Saracho, Bustamante, Saavedra, etc.—all branches of education have received a powerful impulse which has placed the Republic in a better situation, but there is still much to be done.

Public instruction is official, free, or private ; primary, secondary, superior, or professional. Primary education is gratuitous and in theory compulsory.

There are at present 166 official primary schools and 737 municipal schools, with about 1,400 teachers and 51,000 pupils. In Bolivia the authorities have made the great mistake, which will doubtless soon be remedied, of confiding primary education to the municipalities, which in most cases are ill-prepared for the task, or incapable, or ignorant. The lack of scholastic buildings is very perceptible in the majority of the departments, where appropriate but modest premises, belonging directly to the State, are badly needed.

In this particular secondary education is more fortunate, having proper buildings set apart for it. Like primary education, it is gratuitous. It is given in eight colleges or national lycées, five free educational establishments, four seminaries, and one religious college, and all together number some 1,800 pupils. The secondary schools are available only for pupils at least eleven years of age who have followed the elementary and middle classes of the primary schools.

II. Superior education includes the departments of law, medicine, and theology, and the technical schools of mining and commerce, and accounts for 68 professors and 600 pupils.

Six out of the eight Bolivian departments are provided with a university, which is nominally constituted and complete, but in five of these universities there is only a single faculty, that of law, which is usually free but subsidized. In Bolivia, therefore, the term university does not bear its usual signification—that of a group of faculties teaching the sciences, letters, the law, medicine, etc.—but simply that of a centre which embraces all degrees of instruction from the lowest to the highest. Only two of the Bolivian universities boast a group of faculties: that of La Paz possesses the faculties of law, medicine, theology, and commerce, and at Sucre (Chuquisaca) there are faculties of medicine, law, and theology. Cochabamba has two

faculties, those of law and theology ; but there is only one faculty, that of law, at Oruro, Potosi, Tarija, and Santa Cruz (El Beni).

Each university has its rector, who is subordinate to the Ministry of Public Instruction. As is natural, the rector gives the greater part of his time to primary and secondary education ; in the domain of superior education the faculties are independent, even in those cities which boast of several. Each has its dean, who is under the orders of the rector of the department or district.

The faculties of theology are virtually independent of the State, which does not subsidize them ; their upkeep, their rules, and discipline are entirely dependent on the Church. The State merely sanctions the granting of diplomas. It is the same with the independent faculties of Cochabamba, Potosi, Santa Cruz, and Tarija. These colleges receive no subsidy from the State, but their diplomas are recognized if the rules as to examinations are observed.

III. The Bolivian Government, realizing the inconveniences of this multiplicity of professional faculties, the vestiges of an obscure provincialism and a false conception of the university ideal, has proposed to reduce the number of universities. Señor Saracho, convinced of the necessity of such action, proposed, with praiseworthy energy, when he was Minister of Instruction, to concentrate the activities of the Government upon three universities only—those of La Paz, Sucre, and Cochabamba, and to place them upon a proper and honourable footing. His successors in the Ministry also requested the Chambers to remedy the state of affairs described. Unhappily this attempt, like so many others, has not been realized ; it failed at the first attack of that notorious provincialism or regionalism which in Bolivia, far from being a stimulant, is fatal to everything that appeals to the general interests of the country.

So far Bolivia seems to be without either the need or the capacity to organize and support for any length of time more than one university really deserving of the name. If only it would content itself with one there would be an end of the spectacle of so-called universities deficient in every necessity—organization, libraries, apparatus, etc.—and with a fairly competent staff but antiquated programmes. Above all there would be an end of faculties with one professor and one pupil, as at Tarija, or one professor and four pupils, as at Cochabamba.

Despite the praiseworthy efforts of many Ministers, it is to be feared that in order to reduce the number of duplicate faculties and at the same time to satisfy rival localities, it will be decided to establish the School of Medicine at La Paz and the School of Law at Sucre. This may permanently prevent the foundation of a single powerful university, provided with the faculties of letters, the sciences, etc., which might be a centre of culture and learning of which the country might legitimately be proud.

IV. The university problem in Bolivia is so complex in the present state of feeling that the Government is rather losing interest in it, and employing its energies in the reconstitution and fortification of the other categories of education : primary, secondary, and technical. This will do the country no harm ; on the contrary ; there is in Bolivia a plethora of advocates and “pettifogging attorneys” (*tinterillos*). As there are many of these, but few causes, law-suits of course arise from mere nothings. Meanwhile, there is a lack of artisans, engineers, and agriculturalists.

However, the impulse given to educational affairs has had one result : the creation in Sucre of a Normal College of Teachers, placed under the direction of a Belgian professor, M. Georges Rouma. This college, which has been remarkably successful, is divided into

two departments : the first is intended to train school-teachers and the second to train professors for the primary schools. The college is residential, and the students are both paying and non-paying. The State provides thirty-two bursaries, which are distributed among the departments. The bursars are provided with books, board, clothing, and medical attendance ; in return they are obliged to teach for at least five years in the schools of the Republic. In 1911, besides the bursars, there were twenty-seven paying students. The courses are completely modern, and include arts and crafts, domestic economy, living languages, and moral and physical education. They are followed by students of both sexes.

In order to remedy the lack of superior education for young girls in Sucre, the professors of the Normal College opened a secondary school in 1910, in which the masters give their services free of payment ; the expenses are met by the director and a rich inhabitant of Sucre.

Another result of the revival of interest in educational matters¹ was the foundation at La Paz, in 1910, of a National School of Commerce. This institution possesses a large and commodious building with two inner quadrangles, one for men and another for women. There are eight classes, well equipped with apparatus, etc. ; a commercial museum, containing specimens of manufactured products, cereals, woods, minerals, etc. A special section for young girls trains them for clerkships in the administrations, or in commercial and industrial houses. This school is really a " college of superior instruction " ; of the

¹ The Government sends students abroad, at its own cost, to Europe, Argentina, and Chile, there to follow various branches of study. This arrangement, which costs £61,760 annually, does not appear to be entirely satisfactory, for although diligent students frequently obtain their degrees or diplomas, it does sometimes happen that they never return to teach in Bolivia.

fourteen professors five are foreigners : Belgian, American, and English. The director also is a Belgian. The Government does not seem entirely satisfied with the latter, who persists in confounding a special technical institute with a secondary school of the secondary type.

Again, among the teachers recruited from foreign countries there are some who have not given satisfaction to the Bolivian Government, sometimes on account of insufficiency, sometimes on account of perpetual disputes with the rectors, etc. Others, fortunately, have done admirable work.

V. Special technical instruction is furnished also by the two mining colleges of the great mining centres of Potosi and Oruro. The School of Mines at Oruro, whose director, together with several of the professors, was engaged in Europe, is the larger of these, and extremely well equipped. It receives twenty residential bursars and twenty paying students, but the latter number is not always complete. There are also some few students who receive gratuitous instruction.

The Government has also founded an Agricultural and Veterinary College, which has recently been transferred to Cochabamba. This Institute has fifty-six students on its books ; it possesses a vast experimental estate, and is well equipped for teaching. There are also in Bolivia two schools of Arts and Crafts, directed by the Salesian Fathers ; one at La Paz and one at Sucre. These are intended to train men for positions as artisans and foremen. The public authorities also propose to found other similar schools in the principal departmental capitals. These establishments have one great advantage over the others in that they are partly or wholly supported by the work of the students themselves.

There are various schemes extant of founding other schools, but at present they cannot be realized. It

takes more than a decree to form an educational establishment ; each foundation of the kind requires an income, professors, equipment, buildings, and a sufficient number of pupils, all matters which cannot be created out of nothing or provided in a hurry. The chief necessity is before all else to improve primary education in all parts of the Republic, and to establish really competent secondary instruction in every department. From £80,000 in 1906, the educational budget increased to nearly double that amount in 1913. This is little enough, but it is in proportion to the resources of the country, and it is constantly increasing.

VI. The capital, even vital problem, for Bolivia, is the provision of elementary education for the native race, which constitutes more than half of the population ; the natives at present devote themselves to agriculture and stock-raising, but of the most rudimentary description, being sunk deep in routine and the crassest ignorance. It is most necessary to instruct this ethnically backward race, and at the very least to teach it the Spanish tongue and a few elementary notions of civilized life. Above all the natives should be made to understand what they can achieve by regular and methodical work ; Bolivia might then count upon a million inhabitants of good productive capacity in the work of the commercial and industrial development of the Republic.

In the provinces, most unhappily, education has not as yet touched the autochthonous element which forms the rural population. In almost every respect the Aymara or Quechua Indian is to-day the same as in the Colonial period ; he has preserved his peculiar characteristics, his old distrust and resentment, which keep him sunk in a kind of servitude, the result of his lethargy and his complete ignorance.

The causes of this deplorable situation are many ; one of the most prominent is the lack of zeal dis-

played by many of the departmental and provincial councils, more especially by the municipal bodies, in the development of a system of primary education. These councils do not always provide teachers for the small number of schools which do already exist in their departments or districts, and when they appoint a teacher he is not necessarily competent and fitted for his post, but is very often simply an individual favoured by a councillor. Moreover, the teacher is not well paid, and in the remoter cantons the regular payment of his salary is sometimes forgotten. So long as this spirit obtains it is impossible that the schools should be conducted in an efficient manner, except in the case of some of the larger municipalities, or that the teachers should remain at their posts when constrained by poverty to desert them.

It must not be supposed that the natives systematically refuse the gift of education ; on the contrary, we have often known them to express a desire to see schools established in their villages, in many of which there is a school-house built by the collective efforts of the community. It is true that these buildings have not always doors to them, and more than a building is needed. But these schools might be very simply organized, and in the case of small villages scattered over a large extent of territory they might be visited by ambulant schoolmasters. The great distance between school and school would not be a very great obstacle, for the natives are accustomed to travel great distances without inconvenience.

VII. Before terminating this chapter, we must note an innovation in the matter of public instruction. This is the establishment of a school which has no connection either with superior or secondary education ; it is quite a humble affair, yet, according to those most competent to speak, it is of greater importance to Bolivia than the most admirably appointed college could be. We know that the larger

portion of the population is composed of Indians, who as yet speak only their native idioms, and who have hitherto (owing to wrong methods or lack of perseverance) resisted all attempts made to bring them into touch with modern ideas. They are nearly all agriculturalists, patient and industrious, it is true, but desperately attached to their ancient and primitive methods. How break down these habits of theirs and make them an integral part of the economic life of the nation ?

This was the problem before a commission which for two years visited various American and European States in order to study the different methods of education in vogue abroad. Having observed the system employed in the education of the negroes of the United States, the commission recommended the foundation of a school in which the basis of studies should be the arts and crafts and elementary agriculture. This school was founded in 1911 as a Normal College for Teachers in Native Schools, and is divided into two departments. In the first children are initiated into the mysteries of practical agriculture and the simplest manual labour, so that when they return to their villages they can share their knowledge with their fellows.

They are also taught to read and write Spanish, and the elements of arithmetic, but no other book-learning. The second department is more generally attended by half-breeds, who, besides learning Spanish, have received a rudimentary education before entering the school ; they learn manual crafts and are taught agriculture, and are expected to furnish elementary teachers for the native schools.

This school occupies two buildings in the outskirts of La Paz ; it also possesses workshops and an experimental farm ; instruction is free, and those of the pupils who do not live in La Paz are boarded at the cost of the State. When all the classes are full the

pupils will number 200. If this interesting and noteworthy experiment succeeds, the difficult problem of making the Indian an economic factor in the State and assimilating him more closely to the national life will have been solved.

VIII. Those who saw the Bolivian army ten years ago would not know it to-day, so greatly has it been transformed and improved as regards its training, discipline, equipment, and cohesion.

Although Bolivia could easily put 180,000 men on a war footing, her active army in time of peace consists only of 6,000 men, divided into three brigades, comprising infantry, cavalry, and artillery; but this little army consists of men well instructed, trained, experienced, and warlike. It would be difficult to find a more sober, indefatigable and enduring marcher than the Bolivian soldier.

The infantry, which is placed under the command of a brigadier-general, is composed of eight battalions (in Bolivia, as in other South American States, the name of regiment is given only to bodies of cavalry and artillery), and one machine-gun company. The cavalry, also under the orders of a general of brigade, consists of two regiments. The artillery, commanded by a colonel, forms another brigade, composed of one regiment of mountain and one of field artillery. These regiments are equipped with fine batteries of Schneider and Canet guns.

All these troops are provided with excellent arms and equipment; however, at the beginning of 1913 General Ismaël Montes made some fresh purchases of arms in Paris. The chief garrisons are stationed at La Paz, Cochabamba, Sucre, Oruro, and Viacha; in the two latter towns, but especially at Viacha, there are vast model barracks. A battalion of enlisted soldiers furnishes the military posts in the northern portion of the Territory of Colonias, and another, but of conscripted men, those in the eastern portion; and



ARTILLERY ON THE HIGH PLATEAU.



OFFICERS OF THE BOLIVIAN ARMY.

a battalion formed in 1911 is distributed over the various districts of the department of El Beni. Puerto Suarez also has a small garrison, and there are cavalry posts in various parts of the Chaco.

A battalion of engineers, consisting of a railway corps and a corps of telegraphists, has lately been formed. Following the example of the neighbouring republics of Chile and Argentina, the Government subsidizes rifle clubs. Military instruction for officers is obtainable at the Military College, the Academy of War, and the College of Military Instructors, all in La Paz. The Military College contained 120 cadets down to the year 1912, but since then, owing to a deficiency of officers, the number has been increased to 150.

IX. Although all the men called upon cannot be utilized, Bolivia has instituted compulsory service. All Bolivians between nineteen and forty-nine years of age without exception owe two years of personal service, and those who are actually to serve are chosen by the drawing of lots. It has been proposed to reduce the term of service to one year in order to double the contingents of reservists ; but this reform would be prejudicial to the quality of the troops, whose training would suffer owing to the capacity of the recruits, most of whom belong to the native races and the lower classes of society. Experience has proved that two years even is rather too short a time to accustom these men to the military life, inculcate a spirit of discipline, and teach a knowledge of Spanish. The education of recruits does not bear only on the technique of war ; it also comprises the elementary education of the natives, none of whom ought to leave the army in a state of illiteracy.

To continue : although obligatory for all, the burden of military service falls almost entirely upon the natives and the poorer classes. The wealthy and comfortable classes have too many means at their dis-

posals of eluding their military duties ; the simulation of maladies or infirmities which are mentioned in positively prodigal fashion by the present law, which affords every facility to the fraudulent ; travelling abroad, in Europe or the neighbouring republics, on the pretext of attending courses at the universities ; or postponement, which becomes final exemption, without the payment of any tax whatever. All these tricks are encouraged by the facility with which young men with influential relatives can obtain a letter of exemption or discharge when the contingent selected by lot is called to arms. This attitude affords the worst possible example to the labouring classes, composed of half-breeds of various degrees, who regard the law of conscription as imperative only in the case of the proletariat. This class in turn employs all the means of evasion at its disposal : sometimes the simulation of maladies, but more particularly the facilities offered by the railway companies ; for a man has only to get accepted as a railway employee and he can at once claim his exemption by virtue of Article 20 of the general law concerning railways.

X. Despite the many Governmental provisions¹ tending to diminish the number of insubordinate citizens, and to obtain the services of at least 1 per cent. of the total population, hardly a fiftieth part of those summoned present themselves at the barracks, because all sanctions and threats are ineffective and illusory. These measures are simply not applied, because the bulk of the insubordinate consist of those very electors who count, rightly or wrongly, on the influence of the elected to prevent their application. In the provinces prosecutions are particularly futile ; they miscarry and are lost to sight in the prefectures,

¹ They cannot obtain university degrees nor professional qualifications, nor become heads of Government workshops, nor fill any public function, and are liable to be sentenced to serve in a disciplinary corps which is handled with the utmost rigour.

or perhaps enable the cantonal corregidors to commit exactions or other abuses against defenceless individuals.

Undeniably these defects in the military law are unjust and undemocratic, but they do little harm either to the army or the nation, for the former obtains a larger proportion of native recruits, who are certainly more robust, and military service enables them to acquire knowledge and habits which will recruit them for civilization. The barracks of Bolivia are, in fact, veritable educational centres; men ignorant as those who compose the majority of the population return to society able to read and write, and are transformed into useful and hardworking citizens. The benefit derived by the Indian is even greater; thanks to his sobriety and his powers of resisting fatigue, he is one of the best elements of the army, and when he leaves it on his discharge, able to read and write, he takes with him acquired habits, a taste for a higher standard of comfort, and a visible inclination toward a more civilized way of life.

In matters relating to his nourishment, lodgment, equipment, and military and intellectual training, it is incontestable that the lot of the Bolivian soldier is improving every year. He receives payment, his health is cared for, and his physical and moral conditions are improved.

XI. In order to improve the training of the army, Bolivia engaged in Germany a military mission, composed of a commandant acting as colonel and general staff officer, three captains acting as commandant, one lieutenant acting as captain, and fourteen non-commissioned officers acting as instructors of infantry, cavalry, and artillery. The duration of the contract concluded with this mission was three years—from December, 1910, to December, 1913.

While we have lived out of France too long to regard matters with the prejudice of a too narrow

patriotism, we were disagreeably surprised to witness a German mission at work in Bolivia, for the choice seemed inconsistent with the tendencies, culture, and temper of the cultivated population. However, we must admit that those detachments of conscripts which we happened to observe appeared to be perfectly trained. Doubtless the ruder German methods seemed to the Bolivian Government necessary to overcome the passive resistance of the natives who form the bulk of the troops.

It is none the less obvious to all who have lived in any of the Latin-American republics that the German methods, German uniforms (especially), and German discipline are not in any way suited to the lively and susceptible Latins¹ who form the population of most of these States, and the apparent adaptation observable is only superficial.

XII. For some time past the writer has witnessed with patriotic satisfaction the success of the French methods of military training in use abroad, as well as the appreciation shown for French munitions of war. The Government of Uruguay has just concluded negotiations with France for the despatch of a military mission composed of officers of all arms, who will act as professors or instructors in the military schools of Montevideo. Another French mission is about to be despatched for a similar purpose to Guatemala, and two other South American republics are now requiring the assistance of France in reorganizing their respective armies. Moreover, the contracts concluded with the French missions now in Peru and the State of San Paolo (Brazil) have lately

¹ The lessons of the recent Balkan war confirm these remarks. That the Turks were so readily defeated was due not to any insufficiency of military training, but because German methods and German organization did not suit the character of the Ottoman soldiery. One may also recall the absence of any effective administration, and the poor quality of the Krupp guns. This war established the superiority of guns of French manufacture.

been renewed for long periods. Finally, the posts of military and naval attachés have been created in Buenos Ayres.¹

We may add in conclusion that in 1912 the Bolivian Government requested the despatch of a French mission composed of a captain of infantry and a lieutenant of the colonial artillery to co-operate in the delimitation of the frontiers of Bolivia and Peru ; and France has also furnished another mission, similarly composed of two officers, to effect the delimitation of the frontier of Argentina and Bolivia. These missions are engaged for periods of two years.

¹ Central and South America are not singular in thus appealing to France. When some months ago the new Chinese Government decided to reorganize its army, it was to French officers that it desired to entrust this particularly difficult task. We may also recall the work accomplished by the French mission which, under General Eydoux, reorganized the Greek army ; a reorganization which enabled the valiant troops of King George, so brutally assassinated at the moment of triumph, to play so excellent a part in the Balkan campaign, and to win the great victories of Ellasona, Saranaporo, Yeritje, Janina, etc.

CHAPTER VII

SCIENTIFIC SOCIETIES. THE PRESS. PUBLIC SERVICES, CUSTOM-HOUSES, ETC.

I. Scientific societies. The Oficina de Estadística y Estudios Geográficos, its aim and work.—II. Its Director and his colleagues. Museums.—III. Public aid.—IV. The Bolivian Press.—V. The various Custom-houses: their scope and the regions served.—VI. Municipal Custom-houses.—VII. The postal service. Advantages of the parcels post.—VIII. The Bolivian coinage and its equivalents.—IX. Weights and measures.

I. SCIENTIFIC societies are of recent origin in Bolivia; however, some already enjoy a real notoriety for the services which they have rendered; for example, the Oficina de Estadística of La Paz. We must not omit to mention the Medical Institute of Sucre; the Medical Society of La Paz; the Sociedad Antropológica and Centro Jurídico of Sucre; the Geographical Societies of Sucre and Santa Cruz; and the Centro Commercial of La Paz.

The majority of these societies issue periodical publications, among which the Bulletins of the medical and geographical societies are worthy of note, and especially the numerous publications of the Oficina de Estadística y Estudios Geográficos.

This last society was founded in 1896, on the initiative of the President, Alonso; until that period many facts concerning public life in the interior, and the present resources and future possibilities of

certain districts, were practically unknown to the Bolivians themselves. It was extremely difficult to obtain data of the slightest value respecting trade or industry, on account of the poverty of statistics. The Bureau of Statistics should put an end to this state of affairs ; its aim, plainly defined in the first article of its rules, being to acquire, compile, and distribute all information respecting the commercial and social conditions of Bolivia. It undertakes the inquiries necessary to a knowledge of the resources of the country, and to any augmentation of its population. From the geographer's point of view, the Bureau undertakes the publication and vulgarization, to use that word in its proper sense, in foreign countries, of the inquiries and discoveries made on Bolivian soil. It is armed with considerable powers and can demand all useful information, not only from the services dependent on the three powers of the State, but also from the various administrations, the various educational establishments, banks, industrial concerns, monasteries, parish priests, etc. Any refusal of information on the part of a public employee is punished, the first time with a fine of 8s. to 16s., and the second time by dismissal. In the case of private business undertakings the fine is raised to £8, in the event of refusal or erroneous information.

II. The Bureau of Statistics has since its foundation been placed under the management of a gentleman as learned as he is devoted to his country : Señor M. V. Ballivian, President of the Geographical Society of La Paz, who still discharged his duties in that capacity even while he held the portfolio of Agriculture and Colonization under President Montés.

One must respectfully admire the truly patriotic determination of this learned polyglot, who is an indefatigable worker and conspicuously obliging. Aloof from the political conflict, Señor Ballivian

strives to serve the interests of his country, of which he has the clearest conception, by occupying himself solely with all that conduces to national progress and prosperity.

This gentleman is surrounded by a group of distinguished collaborators ; such as the engineers Arturo Ponanski (an archæologist whose passion is the study of the famous pre-Inca remains of Tiahuanaca) ; Aniceto Blanco and E. Mallea Balboa, mining specialists ; Casto F. Pinilla and Luis S. Crespo, the former a notable statistician and geographer, and the author of various monographs which would be of the greatest service to travellers intending to travel in the interior of Bolivia, as they contain itineraries to be followed in order to reach this or the other region, with the relay stations and distances enumerated with all possible accuracy.¹

Despite the progress and activity of this bureau, the results obtained were for many years anything but brilliant ; in particular the statistics emanating from the customs services, as in the case of the majority of the customs posts, especially the more remote, these were either incomplete or non-existent.

Energetic measures had to be taken to mitigate such negligence ; but in spite of all efforts a certain number of years were necessary to induce the staffs of the public administrations and the heads of private businesses to furnish the information required, and the results have been really satisfactory only since 1909, when, by dint of dismissals, circulars, and

¹ Among the publications of this bureau one may with profit consult : *Geografica de la Republica de Bolivia* (official edition), *Indicaciones sumarias para el Immigrante en Bolivia*, and *Guia del Viajero en Bolivia* (almost identical works) ; *Censo de la Población de Bolivia en 1900*, by L. S. Crespo ; *Monografia de la Industria de la Goma Elastica en Bolivia*, by M. V. Ballivian and Casto F. Pinilla ; *Monografia de la Industria Minera*, by Aniceto Blanco ; *Vade Mecum del Minero en Bolivia*, giving an account of the mining law, by Mallea Balboa, etc.

pamphlets, the central bureau succeeded in making it understood that the progress and development of the country required serious and reliable statistics.

The National Museum of Natural History and Industry at La Paz is to some extent dependent on the Bureau of Statistics. La Paz also contains a Municipal Museum, which possesses magnificent samples of the natural riches of the department. Oruro and Potosi have each a museum in which all the minerals of the country are displayed, and at Tarija there is a Museum of Palæontology, which as yet is of no great importance.

III. The services of public aid, which as yet are not very highly developed in Bolivia, on account of the wide distribution of the bulk of the populace over a vast territorial expanse, are in each department administered by an officer of health. The only hospitals which are fairly well equipped and organized are in the towns of La Paz, Sucre, Cochabamba, Oruro, Potosi, Santa Cruz, Tarija, Trinidad, Tupiza, Sorata, Chulumani, Coroico, Achacachi, Capinota, Mizque, Pulacayo-Huanchaca, Colquechaca, Riberalta, Villa Bella, etc., which possess one or more such establishments. In the departmental capitals there are also hospitals or asylums for the infirm and orphans. Nearly all these establishments are entrusted to the care of European Sisters, mostly French or Italian.

In all the departmental capitals and in some provinces there are mutual aid societies, which provide their members with attendance in case of sickness, or bury them. Any Bolivian or foreigner may belong to one of these societies so long as he conforms to its rules. The most important societies of this kind are in La Paz, where there are a dozen ; there are also benefit societies among the French, German, Spanish, Italian, and Peruvian colonies, constituted with special regulations. At Sucre there

are six mutual aid or benefit societies ; two at Potosi, two at Oruro, and others at Tupiza, Tarija, Corocoro, etc.

IV. The Press has not yet acquired the same importance and influence in Bolivia as in Chile and Argentina ; there are barely 130 journals, gazettes, or reviews in the whole Republic. In La Paz, however, there are a few journals of modern type, which are a credit to the increasing culture of the country.

However, these five or six dailies are small in size, printed on four pages, two at least of which are devoted to advertisements and announcements. As everywhere in Bolivia, politics occupies the place of honour. From time to time one meets with a few literary articles, grave and emphatic in style, and sometimes studies, which, unfortunately, are not as a rule very lucid, of the social and economic activities of the country. In general an intimate local chronicle occupies most of the space, together with scraps of topical news, announcements of anniversaries, social functions, engagements, etc.

The writers are ill-paid and do not yet enjoy the consideration which some of them deserve. The telegraphic service yields very scanty news of the outside world, and even the daily papers do not yet receive their news direct from Europe. Some obtain their information from neighbouring capitals—Buenos Ayres or Santiago—their news being despatched by their correspondents after publication in the foreign Press. Bolivians are particularly given to borrowing articles written by some of the best European writers, so that readers unaware of this little peculiarity might suppose that these articles were written for the local papers.

The *Comercio de Bolivia* is the oldest and best of Bolivian journals ; then comes *El Tiempo*, organized in the modern style ; *La Tarde*, *La Verdad*, and the *Diario*. We have already stated that all scientific

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and literary societies of any importance issue publications, which are well received.

V. A few hints as to the various custom-houses of the Republic, and their effect on the movements of foreign trade, in the regions whose exports and imports they handle, will be useful to European exporters.

The foreign trade of Bolivia is at present carried on by way of the custom-houses of Guaqui, Oruro, Uyuni, Tarija, Puerto Suarez, Villa Bella, Abuna, Madre de Dios, Bahia or Cobija, and the customs agencies of Antofagasta, Arica, and Mollendo. There are also a certain number of small customs posts.

The Guaqui custom-house, which has just lost the reason for its existence by the opening of the Arica and La Paz railway, has been transferred to the latter city, where, indeed, it was of old ; and there was some question of placing it at Viacha, where the three lines of railway now running to La Paz diverge. Of all Bolivian custom-houses the most important is that of La Paz. It serves only the department of La Paz, but that department is the busiest in the whole country. The flourishing state of trade in La Paz is due to the nearness of the Pacific coast, with which the department communicates by the railways running to Mollendo and Arica.

The custom-house of Oruro is the most central, and serves the departments of Oruro and Cochabamba ; it deals with merchandise imported by the Antofagasta Railway, and also with that coming through Arica and destined for the interior of the country. The activity of this custom-house will be considerably increased by the construction of the projected railway from Charana, on the Arica line, to Oruro, a distance of about 112 miles, instead of the 248 miles of the present route through Viacha.

The Uyuni custom-house is charged with the control of the operations of the custom-houses of Anto-

fagasta and Tupiza. It also forwards nearly all the mineral exports of the department of Potosi, a certain proportion of those of Oruro, and a portion of the goods imported into Tupiza. Tupiza is situated about one march from the Argentine frontier, and controls the little Bolivian custom-house of La Quiaca, which it will shortly absorb ; through these custom-houses pass the imports of Argentine origin, or of foreign origin coming by way of the Argentine, generally destined for the departments of Potosi and Chuquisaca, and a certain proportion of the exports of the department of Potosi. The same is true of Yacuiba, also on the Argentine frontier, and of the custom-house of Tarija, which serves a portion of Santa Cruz.

Yacuiba, Puerto Suarez, San Matias, Villa Bella, Abuna and Cobija or Bahia, form the fiscal frontier of the eastern portion of Bolivia, a country of only partial but increasing civilization ; so that these posts acquire a greater importance daily.

The customs post of Puerto Suarez, at the extremity of the department of Santa Cruz, on the western bank of the Rio Paraguay (below Bahia de Caceres), and facing the Brazilian town of Corumba, serves the department of Santa Cruz. By way of Villa Bella, which is situated at the confluence of the Rios Beni and Mamoré, on the Brazilian frontier passes the rubber exported from the department of El Beni and a large tract of the Territory of Colonias. But already the other small posts of the north and north-east are gaining upon Villa Bella ; among these Cobija, on the Rio Acre and the Brazilian frontier, yielded the largest figures for 1911. The yield of the customs of Cobija in that year was £72,419, as against £17,540 in 1910, realized principally on rubber.

VI. We have seen that independently of the national customs each municipality has established

internal customs, which are imposed on the various articles imported by their district. These taxes are as hurtful to their intermunicipal relations as they are to their relations with foreign countries ; and they are increased in the case of merchants or commercial travellers by a tax varying from £8 to £24.

To sum up : we find in Bolivia, still in practice, all the Governmental institutions implanted at the time of the Spanish domination, and well calculated to burden the free development of trade to the cost of all ; the taxes on imports, the monopolies, tributes, duties on sales, tithes, etc., taxes which really fall on the consumers and the natives. It is a matter for astonishment that among so many really remarkable men—remarkable for their knowledge and political influence—the majority still most energetically defend these privileges, influenced by a regrettable local patriotism, and do not seem to realize that they are obstructing the development of the nation's wealth and injuring all alike.

We must not forget to inform the reader that the fiscal dues are collected half in gold at the exchange rate of 12 Bolivians 50 centavos per £1 sterling, and the rest in silver ; or if these dues are paid wholly in silver they are surcharged to the extent of 50 per cent., except for fractions of less than 12.50 Bolivians.

VII. Bolivia forms a part of the Universal Postal Union ; all the large towns and departmental capitals are very well served, while the chief towns of the provinces and the principal cantons possess post offices.

In the interior the posts are carried by postilions, or *chasquis*, who relieve one another from village to village ; and the expense is not unduly heavy if we consider that the bulk, not to say the whole, of the native population is still so illiterate that in

certain parts it has been found necessary to suspend the posts for lack of postal matter. The charge for ordinary letters to Europe is 22 centavos (about $4\frac{1}{2}$ d.), and the registration fee is 8 centavos (about $1\frac{1}{2}$ d.); and in the interior a letter sent from one department to another of the same province must bear a 5 centavo stamp, or if sent from one department to another a stamp of 8 centavos in value.

Bolivia has concluded special diplomatic conventions with the other South American republics; letters to or from these countries bear only an 8 centavo stamp. Correspondence between these republics enjoys other and additional privileges, such as the exemption of official communications, etc. Journals and printed matter of the most varied categories circulate post free in the interior of the Republic.

All the capitals of departments and provinces, as well as the principal rural districts, are united by telegraph and possess a telephone service. The price of telegraphic messages in the interior is 5 centavos, or 1d., per word; the ordinary tariff for a cable from Bolivia to France is 2 Bolivians 4 centavos, or 4s. a word.

Business men should not forget that it is easy to trade with Bolivia by means of postal packages, which are received at La Paz, Oruro, Potosi, Cochabamba, Sucre, and in general at all the railway stations. The practical advantages to trade offered by the postal service has occasioned a considerable increase in the number of postal packages. In 1911 53,426 such packages were received from abroad, yielding the State a revenue of £16,838; but only 1,799 were sent from Bolivia, while only 4,516 circulated in the interior. As will be seen, the greater number of these packages come from abroad—from Europe; and the parcels post is growing heavier daily. To judge by the figures for the first six

months of 1912, it is probable that the total for that year will have been double that of the year before. All postal packages coming from abroad are delivered to the recipient in the post office, in the presence of a customs officer, who will collect the duty due ; but this must not exceed a sum of £8.

VIII. The monetary unit in Bolivia is still the silver standard florin, the *boliviano*, which is divided into 100 centavos. This piece, which is like the French 5 franc piece, weighs 25 grammes, and contains 90 per cent. of pure silver. The Bolivian is divided into half-Bolivians of 50 centavos, pesetas of 20 centavos, reals of 10 centavos, and demireals of 5 centavos. The pieces of 5 and 10 centavos are of nickel ; those of 1 and 2 centavos of copper. To-day one finds silver coins only of 50 and 20 centavos in circulation, as Bolivian silver has not been issued from the banks for many years. There are also bank-notes of 1, 5, 10, 20, 50, and 100 Bolivians, which are compulsory tender.

As will be seen presently, there is a question of modifying the monetary system and establishing a gold standard, when the monetary unit would be the gold Bolivian or peso, which is equivalent to a fifth of a pound sterling, as in Peru. The typical coin would then be the piece of 5 Bolivians, equivalent to 12 Bolivians 50 centavos in silver, and equal in weight, size, and value to the English sovereign. The English and Australian sovereigns have the legal value of 12.50 Bolivians (silver), so that each Bolivian is equivalent to 19.20 pence, or 2 francs, 50 centavos being equivalent to 1 franc. Exchange varies only by small fractions of a penny.

IX. Although since the law of 30th of September, 1893, none but the decimal system of weights and measures is legal in Bolivia, the old Spanish, or rather Castilian, measures are still in use throughout the interior. It may be of use to give the metrical

equivalents, of these, the most commonly used measures :—

MEASURES OF LENGTH.

| | | | | |
|---------------------|-----|-----|-----|----------------|
| The vara | ... | ... | ... | = 0 metre 8359 |
| The pié (foot) | ... | ... | ... | = 0 metre 2786 |
| The pulgada (thumb) | ... | ... | ... | = 0 metre 2321 |
| The linea (line) | ... | ... | ... | = 0 metre 1934 |
| The punto (point) | ... | ... | ... | = 0 metre 1612 |

MEASURES OF CAPACITY (CORN).

| | | | | |
|----------------------|-----|-----|-----|---------------------------|
| The fanega | ... | ... | ... | = 0 hectolitre 55 litres |
| The almud or celimin | ... | ... | ... | = 4 litres 62 centilitres |
| The cuartilla | ... | ... | ... | = 1 litre 15 centilitres |

MEASURES OF CAPACITY (LIQUID).

| | | | | |
|---------------------|-----|-----|-----|----------------------------|
| The arro or cantara | ... | ... | ... | = 16 litres 13 centilitres |
| The cuarta | ... | ... | ... | = 4 litres 62 centilitres |
| The azumbre | ... | ... | ... | = 2 litres 2 centilitres |

MEASURES OF WEIGHT.

| | |
|---|-----------------------------------|
| The tonelada or 20 quintals | is equal to 920 kilos 186 grammes |
| The quintal or 4 arrobas | is equal to 46 kilos |
| The arroba or 25 libras | is equal to 11 kilos 500 grammes |
| The libra or pound | is equal to 460 grammes |
| The fanega of 136 libras | is equal to 62 kilos |
| The cajon (a mining measure) of 50 quintals | is equal to 2,300 kilos |
| The marco (for precious metals) | is equal to 230 grammes |
| The onza or ounce | is equal to 28 grammes |

MEASURES OF VOLUME.

| | | | | |
|-------------------|-----|-----|-----|--------------------------------|
| The tonelada | ... | ... | ... | = 1 cubic metre 516 decimetres |
| The cubic vara | ... | ... | ... | = 584 cubic decimetres |
| The pié, cubic | ... | ... | ... | = 21 cubic decimetres |
| The cubic pulgada | ... | ... | ... | = 12'51 cubic decimetres |

The measures of surface are also different from the decimal system, but as the nomenclature is very similar misunderstandings are frequent.

Thus the league, in Bolivia, is always the Spanish geographical league, or one-twentieth of a degree ; this league measures 5'56 kilometres, or 3'45 miles ;

but the official Bolivian league is the common metric league of 5 kilometres, or 3·105 miles.

The *cuadra* is equal to 150 *varas*, or 125·38 metres.

The *vara* of 3 Spanish feet is equal to ·836 metre.

The *legua cuadrada*, or square league, is equal to 1,296 square *cuadras*, or 28·385 square kilometres ; the square *cuadra* (*cuadra cuadrada*), equal to 2,250 square *varas*, is equivalent to 1 hectare 572 ares, and the square *vara* of 9 square feet (Spanish) is equal to 699 square centimetres.

CHAPTER VIII

FOREIGN TRADE OF BOLIVIA. FINANCES. BANKS

- I. The economic development of Bolivia.—II. Statistics of Exports and Imports.—III. Increase of Exports and Imports.—IV. The principal exporting countries.—V. Budgetary resources. Too optimistic estimates. The results of a prudent forecast.—VI. The national and foreign debts of Bolivia.—VII. Banks and banking. The Banco de la Nacion Boliviana.—VIII. The Banco Nacional de Bolivia. Other banks of issue.—IX. The German banks.—X. Probable establishment of a gold standard.

I. THE commercial crisis which weighed so heavily upon Bolivia for many years has to-day completely passed away, as is proved by the constant increase of her trade and industry ; the country is entering upon a period of prosperity, which, wisely utilized, should place Bolivia upon a solid financial basis, and permit her, in the future, to confront with unmoved confidence those economic disturbances which periodically affect national life.

Thanks to the labours of the Bureau of Statistics, which is year by year perfecting its methods, it is far simpler than it used to be to obtain figures relating to the foreign trade of Bolivia, both as to imports and exports.

However, as the compilation of complete reports is not very easy on account of the distances which separate the twelve custom-houses and agencies of the country, we so far have no complete figures for a later year than 1911.

II. The economic results of the year 1911 were more favourable than those of 1910, thanks to the good prices obtained for tin, the principal Bolivian export. The foreign trade of the country increased to £11,280,206, of which £4,669,713 represented imports and £6,610,493 exports, leaving a balance of £1,940,781 in favour of the latter.¹

The statistics for the year 1910 gave a total of £9,949,516, of which £6,045,323 represented exports and £3,904,193 imports. The following table shows the commercial development of Bolivia during the last ten years :—

| Year. | | Imports. | Exports. | Total. |
|-------|-----|-----------|-----------|------------|
| | | £ | £ | £ |
| 1903 | ... | 1,302,271 | 2,013,532 | 3,315,803 |
| 1904 | ... | 1,432,767 | 2,517,202 | 3,949,989 |
| 1905 | ... | 1,623,902 | 3,343,675 | 4,967,577 |
| 1906 | ... | 2,406,986 | 4,452,361 | 6,859,347 |
| 1907 | ... | 3,031,809 | 4,826,524 | 7,858,333 |
| 1908 | ... | 3,258,603 | 3,912,649 | 7,171,252 |
| 1909 | ... | 2,737,981 | 5,101,157 | 7,839,138 |
| 1910 | ... | 3,904,193 | 6,045,323 | 9,859,516 |
| 1911 | ... | 4,669,713 | 6,610,493 | 11,280,206 |
| 1912 | ... | 3,960,719 | 7,209,839 | 11,170,558 |

III. It will be seen that during these ten years the value of the exports has steadily increased, with the exception of the year 1909, while the imports increased as regularly except in the years 1907 and 1908. This stagnation was due to the sudden fall in the price of tin and copper, which in Bolivia was rendered more sensible by the lack of proper means of transit, poor equipment, and the defective methods in use in most of the mines.

The exports of the chief mining products of

¹ The statistics obtainable being incomplete at certain points, and the value of exports being calculated on the average price of the products on the London market, and that of the imports on the official customs tariff, without including certain duties payable to the State, it might be prudent to reckon the actual figures as about 25 per cent. more, or to increase the figure of the imports by £1,167,704.

Bolivia—tin, silver, copper, bismuth, etc., of which details will be found in a later chapter—amounted in 1912 to 54,516,690 kilos, or some 2,478,000 tons, of an official value of £5,636,865.

It will be seen from the above table that the imports increase more quickly than the exports, although the latter are still in excess and although this excess increases. This increase of imports no doubt corresponds with the period of active railway construction, and the preparation for the greater development of the national industries ; that is, with the arrival of fresh capital, a certain source of production.

The imports have increased almost fivefold in these ten years, and the exports almost threefold, so that the total increase of foreign trade is 235 per cent. The figures for 1911 exceed those for 1902 by £7,905,413, representing a general increase of 335 per cent.

These are satisfactory figures ; yet it is highly probable that they are below the truth ; one has only to glance at the map of Bolivia, open as it is to the trade of five neighbour states, to realize that smuggling must be in a flourishing condition and account for a respectable commercial movement.

VALUE OF EXPORTS TO BOLIVIA.

| | | | | 1906-10. | 1911. |
|---------------|-----|-----|-----|-----------|---------|
| | | | | £ | £ |
| England | ... | ... | ... | 3,413,679 | 997,603 |
| Germany | ... | ... | ... | 3,434,160 | 824,874 |
| United States | ... | ... | ... | 3,195,257 | 789,169 |
| Chili | ... | ... | ... | 1,777,342 | 746,985 |
| Belgium | ... | ... | ... | 3,914,536 | 325,136 |
| Peru | ... | ... | ... | 783,981 | 220,752 |
| France | ... | ... | ... | 685,574 | 226,541 |
| Argentina | ... | ... | ... | 596,234 | 257,566 |
| Italy | ... | ... | ... | 427,937 | 113,632 |

IV. Business men will be interested to learn which countries sell the greatest quantities of produce to Bolivia. The preceding table gives the countries



A STREET IN LA PAZ.



CALLE ILLIMANI, LA PAZ.

trading with Bolivia in the order of the importance of their trade, with the value of the products sold during the periods 1906 to 1910 and during the year 1911.

V. The budgetary resources of Bolivia are chiefly based on the custom duties on imports, and on the exportation of minerals and rubber ; the internal revenue consists largely of the taxes and the indirect monopoly of alcohol and matches. These resources are constantly increasing, and the expenditure naturally does the same. For some years an undue optimism in estimating the Budget resulted in a lack of financial equilibrium. The Legislative Chambers tended to swell the budget of the receipts in order to balance the expenditure, so that the actual receipts were often less than the estimated, on account of the fall in the European market prices of such exports as tin, copper, rubber, etc. This is what occurred in 1910, a year in which the budgetary deficit reached its maximum of £372,800.

The prudent exhortations yearly renewed by the Executive, and the lessons of experience, enabled the Chambers to establish juster estimates and to balance receipts and expenditure. The most interesting figures are those for 1911. That year the national revenue attained the sum of £1,527,113, an increase of £333,558 over the figures for 1910, and £301,787 in excess of the estimates, a surplus which covered the deficit caused by the excessive estimates and supplementary credits of 1910. This happy result was due not only to the rise in the price of metals, but to the prudence with which the resources of the State were on this occasion calculated.

The year 1912 promised to be equally favourable, for during our travels we learned that the customs receipts for the first three months of the year were £133,172, an increase of £18,851 over the receipts for the same period of 1911.

The Budget of 1912 was estimated at £1,378,968. To effect yet another economy Congress voted a law which will reduce the number of employees dependent on the Ministry of Finances, and the estimate for 1913 puts the expenditure at £1,772,744.

VI. Until recently Bolivia really had no expenses beyond the interest on her national debt, which from £400,000 had by 1910 been reduced to £80,000. This last figure was increased in 1911 and 1912 by the bounties and military rewards granted to the survivors of the Pacific War, and, perhaps a thought too liberally, to the soldiers, priests, and civilians who had played any part whatever in the Acre campaign, a piece of liberality which necessitated the issue of bonds to the value of £150,328, and by the end of 1912 had increased the internal or national debt of Bolivia to £306,000.

Not until 1908 did Bolivia contract her first foreign debt. This was known as the Morgan loan, and was for £500,000, and is now approaching amortization. In 1910 the Government, convinced of the necessity of appealing to foreign capital in order to increase the productive capacity of the country, and to create and develop the nation's economic equipment, contracted by means of the *Crédit Mobilier Français* a loan of £1,500,000 sterling at 5 per cent.

By the 30th of June, 1912, the foreign debt of Bolivia was £1,965,350 sterling; namely, the Morgan loan, reduced to £473,600, and the loan of £1,500,000 negotiated in Paris. Against this we may balance the million pounds which served to found the *Banco de la Nacion Boliviana*, represented by 100,000 shares to bearer and £300,000 available for various expenses foreseen by the law then in force. This shows that the product of the 1910 loan is almost intact.

The amortizations and the interest on these loans are paid punctually twice yearly, in advance, as well as the monthly payment of £5,000, which, in pursuance of a contract, is paid in guarantee of the interest on the capital employed in the construction of railways.

In March, 1913, Bolivia procured a fresh loan of a million sterling, the same French house acting as intermediary. This loan, a direct debt of the State, like that preceding it, whose service must be assured by the general resources of the country,¹ is intended for the construction of a line of railway of prime interest and value—the line from La Quiaca to Tupiza, which will connect the Bolivian and Argentine railway systems without a break. These two foreign debts—and this is especially true of the last—are not really a burden on the State, as would be an unproductive loan; on the contrary, they are serving to give a fresh impulse to the revenues of the State, for the railway from La Quiaca to Tupiza will be a certain and immediate source of revenue.

VII. There are in Bolivia six financial houses which have the right to issue bank-notes on providing all the guarantees required by the law.

These six banks are : 1. The Banco de la Nacion Boliviano, founded on the 7th of January, 1911, at La Paz. It is at once a loan bank, a bank of issue, and a deposit bank. It commenced operations with a capital of two million pounds, subscribed in 200,000 shares of £10 each. As we have seen, the Government set aside one million pounds of the loan of 1910 for this bank, and the remaining 100,000 shares were to be subscribed in gold; wholly or in

¹ In 1911 the available surplus of customs dues on the exportation of rubber and minerals was three times as great as the sum of £60,000 sterling required for the service and amortization of the loan of 1911.

part by the public or by the banks of issue already founded. This Bank of the Bolivian Nation (supported to a certain extent by the *Crédit Mobilier Français*, the *Banque Française pour le Commerce et l'Industrie*, and one London bank), has the character of a State bank), as it administers much of the Treasury money, and has the right to issue bank-notes, while carrying on all the business of a private bank.

Its authorized capital is £2,000,000 ; its paid-up capital on the 1st of January, 1912, was £1,275,000. Its right of issue on the capital paid up is £1,912,500, but it has actually issued only £120,000 in notes. By the terms of the Bolivian law the banks are required to draw up and publish a balance-sheet every six months, with a profit and loss account ; these are published on the 1st of January and the 1st of July of each year. The accounts relating to the first six months of 1913 are striking reading ; they reflect in so emphatic a manner the economic situation, on which Bolivia cannot fail to congratulate herself.

These figures show that the fiduciary circulation is £99,237 for a metallic deposit of £224,418 ; so that the Bank of the Nation has a large margin and can widely extend its operations.

The deposit accounts amounted to £252,511 ; the debit accounts were £1,450,731, of which a great proportion is immediately realizable in gold ; so that depositors have abundant security.

Finally, as to profits and losses : we find the profits amounted to £55,233, which, after the deduction of the charges and the numerous amortizements very wisely paid on the foundation capital, leaves a net profit of £32,566. These results, interesting in themselves, are worth emphasizing, and augur well for the success of the new bank, the country now being in the full tide of development.

VIII. 2. The Banco Nacional de Bolivia is an old establishment, founded in 1871, which has recently increased its paid-up capital to £520,000, having an authorized capital of £1,000,000. It has branches at La Paz, Sucre, Cochabamba, Camargo, etc. With a capital of £520,000 its net profits for the first six months of 1912 were £42,782, which enabled the bank to pay its shareholders a six-monthly dividend of 6 per cent. and to increase its reserve fund by £7,303.

These results, good in themselves, having been achieved with a comparatively small capital, are still more interesting if we note how far they exceed previous results ; for instance, the balance-sheet for the 30th of June, 1910, showed a six-monthly profit of £35,809. This bank, which has the privilege of issuing notes, has a metallic fund of £492,476 and a fiduciary circulation of £666,681 ; so that the latter is well secured, nearly 80 per cent. of the notes being represented by specie and precious metals in the vaults of the bank ; for by the terms of the law banks of issue must have a metallic fund of at least 40 per cent. of the notes in circulation.

The sums at the bank's disposal on current account, deposit at sight, and deposit, are £775,320. These figures prove the flourishing state of the bank and the increasing economic activity of the country. The same may be said of the four similar banks established in Bolivia.

3. The Banco Mercantil was founded with a paid-up capital of £600,000 (£2,000,000 authorized) and a right of issue of £900,000, of which sum it has issued only £532,216, and metallic funds of £451,066. In 1913 this bank was amalgamated with the preceding bank.

4. The Banco Argandona, founded in 1893, has an authorized capital of £1,000,000, of which £320,000 is paid up. This bank has a right of issue

of £480,000, and has issued £467,080 ; it has metallic funds of £213,490.

5. The Banco Industrial commenced in 1899 with an authorized capital of £1,000,000, of which £200,000 has been paid up. It has a right of issue of £300,000, of which £212,240 has been issued, and metallic funds of £81,659.

6. The Banco Agricola dates from 1903 ; the actual capital is £136,000. This bank has a right of issue of £204,000, of which £84,800 has been issued, and metallic funds of £33,662.

Together these six banks have a paid-up capital of £3,051,000, and have issued paper to the value of £2,182,875, which is guaranteed by funds in gold of £1,541,343, or 85 per cent. of the value of the notes.

IX. Besides these six banks of issue there are in Bolivia branches of two German banks : the German Transatlantic with a capital of 30,000,000 marks, of which 6,837 are reserved, and the Banco Chile y Alemana.

The Germans have long seen the importance of establishing banks in the South American republics. The two banks here mentioned do considerable business, but the German Transatlantic Bank, an offshoot of the Dresdner Bank, has a particularly good standing ; it has won a predominant position in Brazil, in the Argentine, and particularly in Chile and Peru.

The expansion of Germany is due to racial fecundity, a great practical business sense, and the development of her mercantile marine. These important factors are in her favour in the conquest of the American markets, where she has long been competing with England. German merchandise is everywhere carried by German ships and is very often bought by German citizens, who are to be found, in colonies of varying size, in all the American repub-

lics. In Bolivia there is not a large German colony, but the greater number of the wholesale commercial houses are German.

X. The economic life of Bolivia is as yet in the period of infancy. Now is the moment to settle in Bolivia and to prepare for the future. The financial situation is already greatly improved, and will improve still further, and the country possesses many resources which have not as yet been taxed. Fresh taxes, from which a portion of the population has hitherto been exempt, and which have not yet been imposed for particular political reasons, might doubtless be established without hampering production or the national prosperity ; moreover, so long as the Chambers show wisdom in the elaboration of their budgets, a real prosperity should be in store for Bolivia which nothing should injure now that the country has recovered her fiscal liberty.

Anxious to ensure the financial situation, the Bolivian Government is considering the introduction of a measure of great importance, the establishment of a gold standard, which might well be adopted with less delay than is supposed. This measure was really decided upon some years ago, the Government then estimating that it might be realized when the Bolivian should stand at 20 pence, or twelve to the sovereign. This is almost the present rate of exchange, and it varies only slightly. But, to effect the reform, powerful financial assistance is required from without : the establishment of a bank with a capital of at least a million sterling, as the capital of the other banks has proved insufficient. When the Government judges the time ripe the following measures will be adopted :

(1) The minting of silver will be suspended and gold will be minted ; (2) the customs duties will be payable in gold at the rate of 20 pence the

Bolivian ; (3) the silver Bolivian will be current and will be accepted in all transactions at the same rate of exchange.

In prevision of this event the metallic deposits in the banks are constantly increasing. Thanks to the resources at the Government's disposal, and the enlightened and enterprising spirit of the men who direct the destinies of the country, it seems that the new monetary system may be established in the near future.

CHAPTER IX

THE INHABITANTS. THEIR CHARACTER, MANNERS, AND CUSTOMS

I. The Bolivian population. Its unequal distribution ; its composition.—II. The various families of Indians.—III. The Aymara Indians.—IV. The Quechua Indians ; types, costumes, dwellings.—V. The native's diet ; his passion for strong drink.—VI. The Bolivian Indian past and present. His suspicious character and love of routine.—VII. His inhospitable temperament. An anecdote.—VIII. His qualities. His occupations. Farmer and shepherd. A wonderful marcher.—IX. The present condition of the Bolivian Indian. Tributes, compulsory tasks and requisitions.—X. The native property system. The agrarian system of the Incas. The old communities an obstacle to individual ownership.—XI. Religion. Idolatrous and superstitious Catholics. The Bolivian priests and their flocks. Servility and despotism.

I. THE census of 1900 gave Bolivia a population of 1,725,271, these figures not comprising those natives living in a more or less savage state in the eastern regions, and of 1,816,271 counting these Indians. In 1909 the total population was calculated as 2,300,000, of whom about 8,000 were foreigners : making about 2·5 inhabitants to the square mile.

There is no doubt that this census is only approximate. The population is distributed in small groups over vast areas, and many regard the census with suspicion and evade it. Probably the truth is excess of these figures.

Small as it is for so large a country, this popula-

tion is most unequally distributed. Despite the absence of towns and the comparatively infertile soil, certain regions of the high table-lands are by comparison thickly populated, which is as well for the mining industry ; and on the eastern flanks of the Cordillera the mining centres are steadily increasing in size. But the region extending towards Brazil and Paraguay, the largest and most fertile portion of the country, is very thinly peopled. One may travel for days without discovering a single dwelling. This condition of affairs is maintained by the inertia of the natives and the lack of roads. The Government is at present considering a possible remedy.

Excepting the blacks, who are very few in number, the population of Bolivia consists of three principal races : the white race, the indigenous race, and the half-breeds issued from these two races.

The basic element of the Bolivian people is the Indian race ; that is, the average Bolivian has more Indian than European blood in his veins. The following figures give the three populations separately : Natives, 792,850 ; whites, 231,088 ; half-breeds, 485,293 ; unspecified, 121,126 ; negroes (scattered over the eastern regions), 3,945.

Of this total 218,845 could read, and 1,525,723 were completely illiterate ; the rest could both read and write. (These figures, it must be remembered, are established partly by calculation, and are perhaps not to be taken very seriously.)

II. The Indian race comprises several large families, of which the chief are the Aymaras and the Quechuas.

In the north-east, north-west, and east of Bolivia there are a number of more or less savage tribes. The chief of these are the Tobas, Chiriguano, Chorotis, Sanapanas, etc., who are found in the Gran Chaco, Tarija, and Santa Cruz ; the Guarayos, Yuracares, Siriones, Isosenos, Bororos, Potoreras,

Penoquequias, also found in Santa Cruz ; the Parintintins, on the banks of the Tamari ; the Mosetenes, Lecos, Chimanes, Araonas, Caripunas, Maneteris, Mojos, Itenez, and Baures, living in the departments of La Paz and El Beni and the Territory of Colonias.

The Aymaras, one of the principal ethnical elements of the Bolivian nation, are found in the north, as far as Peruvian territory, on the banks, islands, and peninsulas of Lake Titicaca, and on the plateau as far south as Oruro. The Quechuas occupy the south and the north of the Argentine.

III. Between these two races there is a difference of type and a greater difference of character. The Aymara is a little above the average height, has the chest strongly developed, the calves powerful, and the feet small. The features are not on the whole attractive ; they are prominent, and indicative neither of intelligence nor goodwill. The head is large, the neck short and thick, the cheeks wide, the nose massive ; the eyes are small, the mouth wide, and the lips thick. The colour is coppery or an olive-brown, varying with the altitude. The hair is black, thick, and strong, but the beard is absolutely lacking.

While the Quechua is docile, submissive, and obedient, the Aymara is hard, vindictive, bellicose, rebellious, egotistical, cruel, and jealous of his liberty ; he is always ready to resort to force. In times of disturbance the factions have always recruited the bulk of their fighters from the Aymaras. Yet they seem lacking in will, except the will to hate all that is unlike themselves. The Aymara is also fanatical, and his is not the fanaticism of religion, but of vanity ; he wants to cut a figure in the religious *fêtes*, which are not unlike orgies of idolatry, and are marked by alcoholic and moral excesses of every kind.

The plateaux are always cool, so the Aymara wears a comparatively warm costume, consisting of a thick

woollen shirt and a poncho of many colours, with dark, narrow breeches coming just below the knee. The legs are bare, and the feet equally so, or are shod with sandals of raw hide. The Aymara, like the Tibetan, another dweller in plateaux, is insensible to cold ; he sleeps barefooted in the hardest frosts, and walks through freezing water or over ice without apparent inconvenience. On days of festival the Aymara replaces the poncho by a sort of tight-fitting tunic. The head is well covered with a large woollen bonnet, which protects the neck and ears. The women also wear a shirt or chemise of thick wool or cotton, over which they throw a mantle of coarse, heavy wool, striped with bright colours, and retained on the chest by a sort of spoon of silver or copper, the slender handle serving as a pin. A heavy woollen petticoat, pleated in front, and usually dyed a dark blue, covers the lower part of the body to the ankles. The Aymara woman wears several of these petticoats superimposed, which gives her a very bulky look about the hips. A somewhat unattractive hat completes the costume. Men and women alike having a perfect contempt for hygiene, all parts of the body are coated with a respectable layer of dirt. Their clothes, which they never put off, even to sleep, are worn until they fall into tatters, and usually give off a disagreeable ammoniacal odour.

The Aymara tongue differs from the Quechua ; it is a harsh, guttural idiom, rather formless, but having conjugations. It is forcible and concise. The peoples conquered by the Quechuas learned the language of their conquerors ; but the Aymaras retained theirs, and when the Spaniards conquered the country, the Aymaras, who had long been a subject race, were decadent and diminishing in numbers.

By the innumerable vestiges of building and the tombs near Lake Titicaca we may judge that this



AYMARA WATER CARRIER



QUECHUA MEN AND WOMEN, POTOSI



INDIAN PORTERS, SUCRE

country was once thickly populated. But the plains afforded no refuge, and the inhabitants could not escape the forced recruiting which supplied the mining centres. At the time of Tupac-Amaru's insurrection the Aymaras, happy to reconquer their liberty, or perhaps merely to effect a change of masters and to satisfy their bellicose instincts, threw themselves into the revolt ; whereupon war, sickness, and famine considerably reduced their numbers. To-day they are estimated to be about 400,000 strong.

The Aymaras are divided into six tribes, according to the regions they inhabit. These are the Omasuyos, the Pacasas, the Sicasicas, the Larecajas, the Carangas, and the Yungas. The Aymaras of the provinces of Yungas, Larecaja, and Muñecas are lighter in tint, cleaner, more intelligent, and less uncouth than the rest.

IV. The Quechua race, whose numbers are greater, are found in many regions of Bolivia. The Quechua is lighter and yellower than the Aymara, and more of a Mongolian type. The features are irregular, the eyes black, the cheekbones prominent ; the narrow forehead is slightly protuberant, and the skull oblong ; the mouth is wide and the nose massive. The stature is rather below the average, but there are tall individuals, who as a rule resemble the Aymara type. Solidly built, the Quechua looks a powerful and muscular man ; but as from childhood both sexes are used to carrying extremely heavy burdens on the back they are not really very strong in the limbs, although the shoulders are very powerful. The Indian is an extraordinary walker ; his legs of steel enable him to travel long distances in mountainous regions without the least fatigue. The women are even stronger than the men, their work being heavier, although they live practically the same life.

The Quechua costume consists of a coloured poncho, a tight woollen vest, and breeches rarely falling below the knee ; the feet are shod with *ojotas*, or rawhide sandals, which take the shape of the foot. The woman wears a small woollen vest, cut low on the bosom ; the skirt is the same as that worn by the Aymara women ; and on a feast-day the Quechua woman wears all the petticoats she possesses, one over another. As they are all of equal length, each shows the edge of that below it, whence a gamut of various colours. The Quechua women are distinguished from the Aymaras chiefly by their hats, which are flatter.

The Quechua idiom is extremely rich and has been studied grammatically.

The Indian race has never been assimilated ; as it was at the moment of conquest, so it is now ; with the same language, the same customs, and the same miserable dwellings, hardly fit to shelter beasts. Isolated and solitary, or gathered into hamlets of a few cabins, they are merely conical huts of unbaked bricks, covered with thatch or reeds, and consisting of one small chamber, in which all the members of the family live in the completest promiscuity. These huts, in which the most wretched poverty and uncleanness reign supreme, contain nothing that we should call furniture ; as a rule there is no bed but the hardened soil or a few coverings of ragged sheepskin.

In the *puna* one sees, skulking round the houses, those dogs which the Indians call *tacus*—animals with dirty woolly coats and the gait and appearance of foxes ; they are the offspring of the admixture of a great many races of dogs ; fierce, distrustful, and taciturn like their masters, but faithful and enduring as are all dogs.

V. The Indian feeds himself mostly on *chuno*, a coarse farina made of frostbitten potatoes, and

on maize and beans ; he also eats *chalone*, or lamb's flesh dried in the sun ; sometimes the flesh of the llama ; and *oca* and *quinua*, a kind of millet which makes a tasty soup ; or *chairo de chuno*, etc. All these foods are usually strongly peppered. To make the *chuno*, which is the basis of his diet, the Indian exposes potatoes to the frost for several days ; they are then washed and dried, firstly before a fire, and secondly in the sun. The pulp is then brayed, and the coarse starch thus obtained is kept in hermetically sealed bags. The *chupe* is the favourite dish of both Indians and half-breeds. It is a kind of stew, not at all unpleasant, composed of potatoes boiled in milk or water, to which are added the flesh of fowls, eggs, cheese, and butter, the whole being strongly spiced.

Coca, we must not forget, is for the Bolivian Indian the stimulant and luxury *par excellence*, and is largely consumed in the shape of quids for chewing. Thanks to coca, the Indian can undergo great exertion or accomplish considerable periods of labour without apparent fatigue and almost without food. We have somewhere read that although coca is of such value to the Indian it is disastrous to the foreigner, attacking the brain and rapidly producing alienation. This is quite a mistake ; we ourselves used coca during our travels in Peru and Bolivia, and were never incommoded. Yet on returning to France we several times resorted to the same stimulant without appreciable result. Doubtless its effect depends somewhat on climate and latitude.¹

¹ (The effect of cocaine, the concentrated alkaloid of coca, changes completely in the course of time : at first a stimulant, it rapidly produces hallucinations, and complete mental and moral alienation. It can, however, unlike opium, be discontinued completely and suddenly without the slightest risk, or indeed any effect but immediate benefit. Presumably the coca-eater rarely reaches the toxic stage.—Tr.)

Chicha is the national drink *par excellence*, and is no less popular in Peru. It is made with maize, which is allowed to germinate in water ; dried, and again moistened, it is baked, water is added, and it is allowed to ferment. *Chicha mascada* is obtained in the same way, except that the maize is masticated by the old folk of the family. But if the Indian loves *chicha*, still more does he love alcohol, which is his favourite beverage. Drunkenness is indeed the chief vice of the Bolivian Indian. He drinks all he can get, and the amount he can absorb is absolutely incredible ; several bottles of rum will disappear down his gullet on a single feast-day. Drunkenness, to men and women both, is an enviable condition and almost second nature, so readily do they yield to it. All their earnings, or rather all that is left of them by priest and corregidor, is spent on alcoholic drinks.¹

VI. Limited as his mentality is, as a rule, the Indian's intelligence was considerably developed during the empire of the Incas. Subjected to the perspicacious supervision of the Inca authorities, the Indian soon acquired the habits of industry, order, and obedience which have since been so disastrous to him, but which in the flourishing days of the empire were the principal element of its tranquillity. Vanquished by the iron hand of the Spanish conquerors, his good qualities were gradually transformed to an abject servility, the work of the violence and ambition of the *conquistadores*. His simple and innocent education, his proverbial honesty, his sober and frugal customs—all were gradually lost as a

¹ (It is characteristic of brown and black people that they do not know when to stop, hence the "anti-drink" laws of North America. But there is little doubt that the Bolivian love of drink is due to the national habit of coca-chewing. Long but slight indulgence in cocaine produces an intolerable melancholy, and alcohol is almost the only antidote. The Indian's suspicion and taciturnity may be partly due to the same cause.—TR.)

result of the abuses which he suffered under Spanish rule.

After three centuries of crushing oppression and a century of liberty which has not touched him, the Bolivian Indian dwells in ignorance in his wretched hut ; everywhere exploited, he wins only the antipathy of those who profit by him. Melancholy by temperament, his features reflect an incurable depression ;¹ crushed by a wretched existence, he is timid at the moment of danger and ferocious after victory ; but he is harsh, haughty, and implacable in the exercise of power. The Indian, whether Quechua or Aymara, does not leave the traveller with a pleasant impression. He cares for nothing that is not personal to him. Crouching with sunken head, his elbows on his knees, he looks at the world with unchanging visage.

Parsimonious and frugal with all that is his own, he is prodigal of the goods of others. He hardly ever laughs, except when he is drunk ; then, from suspicious and reserved, he becomes almost communicative ; but if he is ever expansive it is only with his own kind. Superstitious to excess, credulous, a fetich-worshipper rather than a Christian, the native is constantly under the domination of his *yatiris*, fraudulent sorcerers or diviners, who profess to be in communication with the other world, and whose predictions are blindly believed.

He is entirely subjected to his employers, to the public officials, and, above all, to the fatal influence of his *curé*, to whom he yields an unrestricted obedience. For the Indian nothing is natural ; neither the forces nor the physical laws of Nature ; all is supernatural, and emanates from the divine wills to which man can only submit.

The Indian is really attached to nothing but the

¹ See note on p. 136.

scrap of earth on which he has built his hut : to this love all other affections are subordinated ; but this one affection, which in general gives rise to others of an altruistic nature, is in him narrow and mean, so that humanity and the world are for him bounded by the limits of his property. His house and his scrap of soil are his native land, his altar, the object of tenderness, yet the constant cause of alarm and defiance, for in every traveller or stranger who approaches his dwelling he sees a usurper longing to despoil him.

VII. Being thus mistrustful, the Indian could hardly practise the rites of hospitality ; as a matter of fact, he is utterly ignorant of such matters ; it is useless to ask him for shelter in a moment of necessity, for to all requests he gives an evasive reply, and finally an obstinate refusal. The traveller who needs a fowl, a lamb, or a kid can rarely procure one, even by offering the most tempting prices.

Consider the following dialogue :

" Will you sell me this lamb ? "

" Impossible, *tatay* ; they are too thin. "

" Never mind, I'll take it as it is. "

" I can't sell it, *tatay* ; impossible ! "

And that is all the satisfaction to be obtained. But if the traveller of experience, or one pushed by hunger, seizes upon the animal by force, the Indian will at once start bargaining, in order to get as big a price as possible ; and will stipulate that he shall be given the skin, and even part of the flesh.

But in spite of this distrust, his rapacity makes the Indian naïvely ridiculous ; witness this anecdote, which was told us on the road to Tupiza, and is thoroughly characteristic of the Indian of the high table-lands :

A muleteer, who in pursuit of his calling had

more than once had to suffer from the meanness of the Indians, invented the dish known as "pebble soup" as the only means of obtaining a few provisions. This is how he exploited the curiosity and avarice of the Coyas.¹ After a long journey he was in positive need of food and rest, but met with an obstinate refusal on the part of an Indian, who was fairly well-to-do, but would furnish nothing in the way of food. Feigning the utmost indifference, the muleteer took from his pack an empty saucepan, and remarked that "that was all right; he knew a way to make a *puchero* with nothing but water and a few stones." Lighting the fire, he set the saucepan on it, full of water and stones, and waited for the stew to cook. The Indian, eager to know the secret of so inexpensive a dish, could not tear himself away from the fire. Presently the muleteer tasted his stew, made a grimace of satisfaction, and, turning to the Indian, said: "That's all right; but I want a little salt to make it better." The Indian, thinking that he was not asked for anything worth grudging, went to his hut and brought the salt. Again the stew was tasted. "Good; but better still if you'd give me a bit of pumpkin." Urged by his ever-increasing curiosity, the Indian brought the pumpkin.

The pot bubbled again; the muleteer tasted and cried: "Splendid! Bring a spoon and help yourself!" But as the Indian turned toward his hut the other called after him: "By the way, since you are going in, just bring a lump of *charqui* or *chalone*, and then it will be just right!"

Then the Indian saw he was being tricked; but he was so avaricious that he brought the meat in order not to lose the salt and the pumpkin which he had already parted with. And so, to the great

¹ Name given to a variety of Quechua Indians.

disappointment of the disillusioned Coya, the pebble soup became quite a passable stew.¹

VIII. If the reader concludes from the portrait we have drawn of the Bolivian Indian that nothing can be done with him, that he must simply be left to stew in his ignorance and inertia, he will be greatly in error.

Besides his inherited defects (which can in part be explained) the Indian possesses some qualities which make his services acceptable. Docile, submissive, frugal, enduring, fearing neither heat nor cold, indifferent to atmospheric variations, he is indefatigable as a bearer of burdens and on the march ; and in the high altitudes he provides a labourer whom no other could replace.

Moreover, the Bolivian Indian usually provides for his modest needs in his own way ; ignorant of the advantages of the division of labour, he weaves the cloth of his own garments—mantle, breeches, or vest—and makes his hat and sandals himself. His chief occupations are agriculture and stock-raising ; but he is indolent, thriftless, imprudent, and, above all, an obstinate conservative ; so he confines himself to growing a few potatoes, a little barley, *quinua*, or *oca*, just as much as he needs to keep him alive. The land, cultivated by the most primitive of means—for the Indian will never accept any innovation, however practical and excellent—is generally very limited in extent, unless the neighbourhood of a city or a mine calls for a greater production than usual. Moreover, thousands of Indians are taken away from their fields by all manner of tasks—by the necessity of transporting merchandise, provisions, machinery, etc., on the backs of mules, asses, llamas, and even men, in countries innocent of other means of transport, to the mines

¹ (However characteristic of the Indian, the tale is, of course, European. It is told of the Norman peasant among others.—Tr.)



INDIAN FRUIT-SELLER, SANTA CRUZ.



QUECHUA INDIAN, CHUQUISACA.



A TOBA CACIQUE.

and factories established in barren and uncultivated regions.

Both the Aymaras and the Quechuas keep little herds of llamas, alpacas, or sheep whenever possible, as their care calls for less labour than the raising of crops. A few fowls and other birds give them eggs, a few pigs furnish leather, meat, and fat; they have the wool of their llamas and sheep, and they utilize even the excrement of the former as a combustible, as the Tibetans do that of the yak. A mule or a donkey grazes round the Indian's hut. From the age of four or five years the Indian guards the little herd of swine belonging to his parents; a little later he grazes their sheep among the mountains, where by means of his *quena*, *zampona*, or *cicus* he learns to play melancholy airs.¹

On the produce of his crops and his herds he lives in poverty, leaving the mountains or the plain only to exchange some of his products for coca or brandy. The woman is rarely idle; whether in the market, or loitering over her household tasks, or even as she walks, one sees her always spinning the wool of the llama or the sheep of which her garments are made.

The Bolivian Indian in general excels in carrying loads, in spite of the lack of tolerable highways, covering daily stages of twenty to thirty miles. The average load is 66 to 80 lb.² With his shoulders free his speed and endurance are amazing; he will cover fifty miles a day for several days on end, and without seeming exhausted, unless for some reason he wishes to seem so. We have seen Indians follow or accompany the coach or the mule which bore us, at the trot, shouting or blowing a pan-

¹ These are flutes and other primitive instruments made of one or several tubes of reed or bamboo.

² (He is therein greatly excelled by the Jamaica negress, who bears burdens twice as heavy and will walk twice as far.—Tr.)

pipe ; and at night they seemed less eager to rest than our mules or ourselves.

IX. The Indian is to-day little better off than he was under Spanish rule. Since the proclamation of Bolivar, which declared him capable of holding property, many Governments have passed laws intended to protect the Indian ; but they have either remained ineffective or they have been overlooked and violated by the very officials whose duty it was to apply them.

The product of the Indian's labour, or his crops, is absorbed by the Treasury, for the Indian has to pay a "contribution," and in principle this tax is all he ought to pay ; but he is also victimized by the priest, who charges him for baptism and marriage, and on burial there is a so-called death duty to pay. Then the *alferezado*¹ takes money ; and alcohol pays a heavy duty. To these expenses we must add the extortions of the *yatiris*, and those of another impostor and sorcerer, the "Son of God," or *Tata Santiago*, who lives in idleness and debauchery, thanks to the tribute which his messengers demand of the native at nightfall, whenever he is busy with his evocations and witchcraft, in order that God may give the community health and plenty. On these nights a young girl forms part of the offering demanded.

¹ A duty or obligation which the Indian is expected to fulfil on the occasion of a religious festival celebrated in one of the churches of a native parish. The victim is appointed by the priest, arbitrarily or otherwise. The *alferezado* must provide the *curé* with the means of transport for himself and his baggage, and must furnish, free of cost, the necessary provisions, such as potatoes, *chuno*, eggs, lambs, butter, etc. These presents, known in some regions as *Rico chico*, often accumulate in enormous quantities after visits paid to a number of churches scattered over parishes often almost as large as an English county. They not only serve to support the *curé* and his family, but enable him to sell the surplus at exorbitant prices to the poor Indians who make sacrifices to provide them in the first place.

Nor is this all. The Indian is subjected to a number of compulsory tasks, such as the *prestation vialé*,¹ for the upkeep of what are by courtesy known as the highways ; and others set by the priest, such as the cultivation of the lands belonging to the Church, or rather to its representative ; while others are set by the corregidor, the governor, etc., who make the Indian work days at a time in their gardens, or building for them, or as muleteer, postilion, etc., without any payment. They must also contribute to collections made for the reception of the authorities, must comply with the requisitions of passing troops, and, finally, must accomplish the *pongueaje*, another improper tax or *corvée*, a survival from the days when the landowner was absolute overlord. The *pongo* is a colonist, settled on a property, large or small, who must serve for a week in the owner's town house. Very often the landowner will possess several pongos, and will hire some of them to others at his own profit. The *pongo* is given the heaviest and most disagreeable tasks ; the other servants and the master's children treat him well or ill as the case may be ; as to his maintenance, no care is taken ; he sleeps in some corner and is fed on scraps.²

Another of the colonist's tasks is to transport, at his own risk and peril, from the field to the town, and often over great distances, the crops belonging to the owner, if so the latter desires. To say nothing of fatigue, much time is lost on these journeys, for everything is borne on the backs of llamas or asses, even in districts served by railways, should the owner choose.

All these *corvées* and obligations the Indian accomplishes with his usual apathy and submissiveness,

¹ This *corvée* is a legal one.

² See *Un Pueblo Enfermo*, by a Bolivian, Señor A. Arguedas, publ. Barcelona, 1908.

but also with the indolence and indifference which are characteristic of the native. Unless he is under very strict supervision the results of his labour are often insignificant enough.

X. Although the community is by law extinct, we are obliged to employ the word to describe the native holdings, as in practice the provisions of the law are more or less of a fiction in the high tablelands of Bolivia. In reality the territorial system of the natives is that established by the Inca sovereigns, who did not recognize private property; the soil was cultivated in community and its produce shared. The unit was the *ayllo*, and each *ayllo* was divided into ten or more *aynocas*, and none of the co-proprietors could extend his crops according to his own free will. The *aynocas* are still cultivated periodically and in alternation, at the rate of one or two a year, the rest being used as pasture for the animals of the community. This system of rotation, of course, limits the area available for agricultural purposes.

The Spanish colonial system has preserved this arrangement, but has modified it by individualizing the property of the natives of each *ayllo* by means of *sayanas* for the imposition of tribute, a territorial tax which has to be paid in silver. The Indians of a community are divided into *originarios*, owning land in the valleys and the *puna*, *agregados*, or colonists owning land, and *foresteros*, or associated foreigners; each of the Indians thus classified pays 9, 7, or 3 Bolivians of tribute, which is collected by the corregidores, who pay it every six months into the departmental treasury.

The laws of the Republic, which recognize the Indian's right of property in his *sayana*, have failed, in spite of the lapse of years, to uproot the sense of community, which with all its faults and inconveniences is still maintained. At the same time, the Indians are still subject to the *alferezado*; they

are compelled to give their personal services to the Church, the priests, the *alcaldes*, the *corregidores*, etc., and are forced to perform onerous tasks which weigh on every member of the community.

The laws of 1874 and 1880, which declared the Indians to be the owners of their *sayanas*, have been obstinately rejected by the majority of the Indians, encouraged by unscrupulous lawyers and business men, who exploit their ignorance and their prejudice. The redistribution of land ordered by these laws has in most cases not been effected; the natives founding their opposition on the confused division of their *sayanas* and the practice of employing a number of common pastures: common not only to the owners of one *ayllo*, but to those of a whole *canton*.

The only communities which have submitted or shown any desire to submit to the new laws are those which have had to complain of the usurpations practised by stronger communities; but for this very reason the latter reject the new laws all the more violently. The rights of each native are really established by prejudice and ancient custom. It is said that the number of communities is in some regions being reduced by a process of absorption by large landowners, but we cannot verify the fact.

XI. All the Aymara and Quechua Indians are Catholics, of a fervent and even fanatical type. There is a great proportion of paganism in their faith, and the Catholic rites are complicated by others inherited from the days of the Incas. To see and hear the Indians during a religious festival one might well take them for idolators accomplishing the ceremonies of the ancient cult of the Sun, followed by a Roman saturnalia, but never for Christians celebrating Easter or the Feast of the Trinity.

All receive the sacrament of baptism, and most are married by the Church; all go regularly in

procession and attend all imaginable ceremonies. They honour, pay, and serve their *curé* far more than he deserves ; but if one were to ask them of the precepts of their religion, or the prescriptions of its commandments, they would not know a word. They have a host of grotesque superstitions, to which they remain faithful with a touching constancy, which is derived from their respect for their ancestors. It is a curious fact that they will allow their old folks to vegetate miserably until death in the spot where age retains them, but everything that their fathers and the father of their fathers loved and adored, that they love and adore in their turn, with an intensity that only increases with the lapse of time.

The ignorance of the Indians and their fanaticism are exploited by their clergy, who demand from them all kinds of personal service, which they would never dream of refusing. Thus each of the images which figure on the altars of the smallest parish church has its own special attendant, and besides these there are sacristans, bellringers, purveyors of lamb's flesh for the priest, etc., who form a staff of servants and labourers employed in all kinds of trivial tasks. At the end of his period of service each poor devil is obliged to order a Mass in honour of the saint whom he has served. However, these occasions are welcomed by the Indian as an opportunity to get comfortably drunk with his family and the neighbours.

If an Indian is comfortably off or possesses any property, he is charged double for all religious ceremonies ; the burial duty, abolished by the law, is still actually paid in the provinces, and is even augmented by 20 to 50 per cent. ; it is the same with marriages, which are consequently very costly, so that many Indians form free unions, postponing the ceremony until a more propitious occasion.

The religious festivals, which are celebrated with

a frequency already mentioned, at the instigation of the clergy or the natives themselves, furnish the latter with an opportunity of abandoning themselves to the most scandalous and cynical orgies ; but their immorality does not offend this singular clergy. In many provinces there are fifteen churches and 130 to 140 chapels, in each of which at least two annual ceremonies are celebrated, without counting those that are arranged spontaneously, so that one wonders how the natives can find any time for useful labour.

This state of affairs is not surprising when we reflect that the priests, with few exceptions, are half-breeds little less gross and ignorant than their parishioners. For the majority the priesthood is not a vocation, but a career chosen simply because it is remunerative ; and the *curés* of remote parishes are accused of all sorts of offences and exactions. All complaints, however, are ineffectual, for the delinquents are defended by the higher clergy, who are not always in a position to replace bad priests.

Despite the advantages of the priestly career, there are all over Bolivia a certain number of parishes which remain vacant, because no one is willing to accept them. These are usually the remoter cures near the frontiers or in the east.

Although the statement may seem surprising in view of what we have said, the Bolivian Indian, as a general thing, is not deserving of any exaggerated pity. One cannot greatly pity him when one witnesses his servile submission to his oppressors, in the absence of any legal compulsion. We pity him still less when we see that although he will give freely and even with good will of all that he has to the *curés*, the *yatiris*, and in general to all who exploit him, he will obstinately refuse everything to travellers who are forced to depend on him, even when offered generous payment. The

traveller, it is true, does not at first know how to approach him.

While it is true that the *curés*, corregidores, lieutenant-governors, etc., are often the worst of petty tyrants in their treatment of the native, there is none more tyrannical than the Indian himself when he possesses any power, and he will descend to the basest conduct in order to obtain the smallest official post. Once appointed *alcalde*, *ilicata*, *curacas*, or *cacique*, he expects all to submit to his authority ; he meddles in everything that does not concern him ; spying into the private life of the people, whether of a hamlet, village, or canton ; bursting with pride and vanity, he wants to rule everybody and make himself felt everywhere.

CHAPTER X

THE INHABITANTS. CHARACTER, MANNERS, AND CUSTOMS—*continued*

- I. Native music. Native instruments. Lugubrious airs.—II. Grotesque dances ; weird costumes. Quechua poetry.—III. The Indians of the North and those of the South contrasted. The Callaguayas and the Uros.—IV. The diminution of the native race. Its causes.—V. Is it possible to educate the Bolivian Indian? His real utility.—VI. Contradictory opinions.—VII. Savage or semi-savage tribes.—VIII. The half-breed or Chola race ; its qualities and defects. The future of the race.—IX. The white population.

I. DRUNKENNESS holds that place of excessive prominence among the Indians' pleasures which has already been noted. They drink, recover, and drink again, as long as time or money will allow, at all their gatherings ; at which they also indulge in music and the dance, the music being of the most lugubrious character.

The Bolivian Indians, like their neighbours of Peru, possess various musical instruments, among them the famous *quena*, a reed flute or pipe of six stops—five along its length and one in the side ; the *quenacho* and the *quenali* differ from it only in size. The *pinguillo* is a flute with a tone like that of the flageolet ; it is especially an instrument of the Aymaras. The *koana* or *marimacho* and the *tarka*, made of a special kind of wood, produce a sound like that of the clarinet. The *zampona*, also called the *sicu* by the natives, is, with the *quena*, the

favourite instrument ; it is a kind of panpipe, composed of four groups of reeds, fastened together in contact and arranged in two separate divisions of two groups each. There are five varieties of the *sicu*, differing only in their dimensions, and therefore in the pitch of the notes. The *taica-hirpa* is very large, and plays the bass ; the *molto* is smaller, and so on with the *licu*, the *chiru*, and the *tuto*, which play a baritone, counter-bass, and tenor.

Among the instruments of percussion are the *putucas* and the *guanacaras*, drums of various sizes. The guitar is also used, though not very often, and the *bandarria*, a species of guitar with bronze strings. The Bolivian Indian, who makes his instruments himself, with the exception of the *tarka*, has a very good ear, and will execute any piece of classical music with precision. The military bands of Bolivia are mostly composed of Indians.

The Bolivian Indian is also remarkable for his ability to execute long passages on wind instruments. Even while dancing he can blow the *quena* or the *zampona*, which shows the vigour of his lungs, a quality due to the altitudes in which he lives. Few inhabitants of ordinary altitudes could endure such a test.

Native music is usually soft, plaintive, and naïve ; its tremulous notes, often repeated five or six times in a minor key, swell and die in a monotonous rhythm which, to European ears, becomes tedious. Never do the instruments or the songs of the Indian suggest an idea of gaiety, but always a profound melancholy, the idea of extreme unhappiness and the wretchedness of a disordered mind.

However, for one reason or another the Indians are now rather improving their music ; and in many parts one notes unmistakable efforts to imitate and adapt the foreign conceptions of music and to mingle them with their favourite native airs. The latter



CHIRIGUANA WOMEN.



CHOROTI INDIANS.

do not lose their melancholy, but are even more affecting.

Despite these improvements, which are not general, the traveller is always greatly impressed when, as he journeys through the mountainous regions, surrounded on every hand by gloomy masses without horizon, he hears, suddenly, at the fall of night, rising near at hand in the midst of a profound silence, the long mournful notes of the *quena*, like a long and profound complaint, which echo repeats in distant sobs. Sometimes the flute is accompanied by the measured taps of a drum or tambourine, and sometimes it accompanies a song, monotonous and guttural as the songs of the Arabs ; sounds inspiring sombre thoughts and provoking a shudder of melancholy in the stranger who hears them for the first time. The *quena*, indeed, produces sounds of a sinister melancholy ; one manner of playing it consists of introducing it into a great crock of earthenware pierced with a hole on either side so that the hands may be introduced ; and when so played it yields notes of sepulchral sonority. In all the arsenal of human music it would perhaps be impossible to discover more doleful sounds.

When this primitive music seeks to interpret a comparatively calm and cheerful frame of mind it is certainly a little more inspiring, but some of its notes are still like the moans of a stricken soul.

II. The native dances are for the most part common to both Aymaras and Quechuas. The most ridiculous and grotesque of these, on account of the extravagant costumes worn by the dancers, are the *Danzantes*, the *Huacas-Tocoris*, the *Pacoches*, the *Morenos*, the *Tundiques*, and others yet, such as the *Sicuris* and the *Chiriguano*.

This last is a war-dance ; the dancers wear each the skin of a jaguar, or something resembling one ; each carries a heavy stick ; the music is harsh and

warlike. The *sicuri* is danced by a group of fourteen Indians, wearing petticoats of white cotton cloth ; on the head of each is a hat adorned with long feathers, the whole having the shape of an umbrella ; they wear tambourines at their girdles and play the *zampona*, using two instruments. The *huaca-tocoris* or *toros danzantes* is performed during the fêtes of Corpus. A wooden framework covered with hide vaguely represents a bull ; in the back of the beast is a hole through which the dancer introduces his body ; his face smeared with soot, and clad in the following costume : white breeches, an old coat, a red poncho, and a hat bearing a semicircular crown of feathers. To imitate a bull-fighter another dancer brandishes a wooden sword in one hand and waves a handkerchief with the other.

The commonest dance among the Indians is a slow, almost automatic *rondo*, the head continually rising and falling and turning from side to side. In another dance the dancers form couples, keeping their ground, and facing one another, accelerating their steps only at the end of each figure.

During Lent the majority of the natives do not employ any instrumental music, but, on the other hand, they attend nocturnal gatherings known as *chochus*, at which young people of both sexes dance round a cross and sing psalms. There is absolutely nothing edifying about these functions, those taking part in them displaying a most disconcerting cynicism. On Easter Day the Indians wear their gala costumes, and ornament their hats with flowers and ribbons ; they make up for their forty days' silence, and fill the air with the sound of *quenas*, *sicus*, and tambourines. But even while dancing they are never gay ; their sombre natures unbend only under the influence of drink.

Among the strange and savage customs of the natives, we must not forget to mention the fights

with whips which take place in certain provinces on Good Friday. On the occasion of the procession of the Sepulchre the Indians build altars along the route of the procession. The latter takes place always at night. Once it is over the altars are demolished by two separate groups—the Huarcas and the Incas, who at once begin to strive for victory. The two groups then assemble in the public place or square, and lash one another with implacable ardour. Triumph or failure is a good or bad omen for the year's harvest.

Poetical songs, accompanied on the *quechua*, are known as *yaravis*. They are greatly appreciated by the natives. The Quechua *yaravis* have been to some extent improved by the modern Bolivians. They are usually a species of round, with a good deal of repetition; each stanza has four to ten lines. These songs reflect the dreamy and sombre character of the race. Love is always their subject; a melancholy, plaintive, and monotonous passion.

III. The lower classes of natives wear such a variety of costume that in order to describe them all one would need to devote a volume to every department of Bolivia. We will content ourselves with noting a difference of bearing, and in some degree of character, which characterizes the Indians of the two extreme regions of the Republic.

The Indian who dwells in the cold regions of the high table-lands of the North, who cultivates the soil only as a colonist, displays, in his humble and melancholy bearing, the submissiveness of the serf. Among the Indians of the native communities this submissiveness is less notable. The Indian of the South, who is less constrained in the exercise of his will, and who cultivates a small holding of his own land (whose yield is certainly extremely poor, on account of his antiquated routine), lives a better life. In the South an Indian who is not a cultivator

is a shepherd, an *arriero*, or he may even wash the streams for gold ; now these are occupations which accustom a man to rely on himself alone ; so that the Indian of the South, although he may not regard himself as the equal of the whites, has at least the rudiments of a sense of human dignity.

One of the most curious tribes of the great Bolivian family is that of the Callaguayas, who inhabit the province of Munecas, in the North. Like the first physicians of Greece, these Indians, who possess certain botanical knowledge, which they hand down from one to another, are the pharmacists, herbalists, and wandering healers of South America.

In the course of their long journeys they give empirical treatment with the aid of plants, barks, seeds, resins, and all sorts of simples, which they prepare after their manner. Dressed in long breeches of blue cloth, ornamented with fringes at the lower extremities, a woollen shirt, and a long, narrow poncho, with the head covered by a wide straw hat, they often leave home for years, carrying on their shoulders two large bags or skins containing packets of medicinal plants. Knowing all the paths and passes of the Cordilleras, speaking a more or less indifferent Spanish picked up on the way, they visit Chile, Peru, Ecuador, and even Colombia ; and we have encountered them, singly or in couples, in all the provinces of the Argentine, and in Brazil as far afield as the State of Rio Grande do Sul, not far from the Atlantic coast. They travel thus, on foot, for almost incredible distances through many countries ; their sacks are never empty, for as their store of herbs diminishes they replace the plants which they contained with the same or equivalent species. On the way home they drive before them small troops of mules, bought in the course of their travels, which they sell at a profit on their arrival.

These Callaguayas, who are known as sorcerers, and are certainly very skilful humbugs, are badly exploited in their own province, where they seem to-day to have lost their old prestige. None the less, they are responsible for the discovery of all the plants used in the native pharmacopœia ; many of the simples used bear their names. Many of the properties attributed to plants by the Callaguayas have been admitted by medical science, which justifies many of the observations of these perspicacious Indians.

Another interesting group, though less sympathetic, is that of the Uros. These Indians, who are despised by all the rest, are the descendants of the first inhabitants, and have been successively subjugated by the Aymaras, the Quechuas, the Incas, and the Spaniards ; but in spite of all have retained their own customs and do not speak the same idiom as their conquerors. The Uros are a short race, about five feet being the average height ; the limbs are well developed and the body powerful ; their type is much that of the other Indian tribes, except that the forehead is narrower and the skin darker. The face is lifeless and without expression ; it betrays hardly a sign of intelligence. Like the Aymaras and the Quechuas, the Uros make their own garments, weaving a coarse fabric of sheep's wool. They live on a few insignificant crops, by hunting, and especially by fishing ; for they dwell on the shores of Lake Titicaca, and especially on some of its many islands. Extremely indolent, they pass their days in their reed-built boats, in the midst of the reeds which border the shores of the lake. Although to-day only a few groups are left of these Uros, forming a small number of ayillos, they will be found along the whole course of the Desaguadero as far as Lake Poopo, or from Pampas Aullagas to the island of Panza.

We may have seemed to devote overmuch time and space to these Indian tribes ; but in Bolivia the traveller, engineer, manufacturer, or merchant must know something of the character, qualities, and defects of a population with which he must necessarily come into contact if he travels in the interior. This knowledge will enable him to obtain from the natives, whose nature is so suspicious and reserved, such services as they are capable of rendering.

IV. Bolivian statisticians agree that the native race is slowly diminishing. They state that in 1878, when drought and famine were followed by typhus, which ravaged the native populations, the race received its death-wound. Without exaggerating the importance of this blow, it is easy to verify the fact that the Indians do not increase ; according to the statistics of Dalence, based on official figures carefully collected, and cited by Crespo in his Geography, there were in Bolivia in 1846 701,558 natives in a total population of 1,373,896. The proportion of natives, including the savage tribes, is about the same to-day.

Among the plagues which decimate the natives, we must note the amazing infant mortality ; due to the deplorable hygienic conditions, whole families living massed together in a filthy hut. The vitality of the race is also compromised by insufficient and defective diet, and above all by the abuse of alcohol, which does more damage in a year than all the diseases together.

The considerable increase of the white and half-breed races is also a factor in the diminution of the Indian race. Wherever the white race establishes itself among natives the numbers of the latter diminish, and are replaced in the first place by half-breeds, and then by the multiple successive crossings which constantly improve the race. One may foresee with some certainty a period when the races in con-

tact will form a single mass, as has happened almost completely in Chile, where a new race has sprung up, homogeneous in type.

V. Will this disappearance of the Indian be for the good of Bolivia? That we doubt, despite the assertions of those—and they are still many—who maintain that the natives are a dead race, incapable of assimilation or education, from which nothing is to be hoped. The backwardness of Bolivia, moral and material, is attributed to the native race : refractory as it is to progress, incapable of innovation, and refusing all usages that have not been transmitted by tradition. This is true ; but can it be said that any serious attempt has been made, since the War of Independence, to instruct the Indian and to rouse him from his ignorance and his deadly routine ?

Those who speak of the incapacity of the Indian to accept civilization have history and the experience of the past against them. The empire of the Incas was certainly in many ways inferior to European civilization, but the vestiges of its religious and civil monuments are an obvious proof of the capacity of the race, although to-day brutalized by servitude and alcohol, to acquire a more perfect civilization. But for the Indian, moreover, the whole high table-land of Bolivia, the only portion of the country which is at all appreciably populated, would be a desert, despite its mineral wealth, for no immigration could replace the native, who accommodates himself to the lack of comfort, the climate, the soil, and the landscape.

Without preferring the Indian to the selected immigrant for the exploitation and population of certain portions of the country which at present are almost deserted and uncultivated, we do consider, whatever others may say, that with all his faults the Indian has solid good qualities which might recommend him as a labourer, more especially as an

agriculturalist, and above all as an incomparable soldier.

All those European mine or factory managers and owners to whom we have spoken are unanimous in their opinion : well treated and reduced to comparative sobriety, the Indian is civil, industrious, and honest, and being gifted with a great faculty of imitation, he has the makings of a skilful artisan. We think with Arguedas and many others that the Indian, taken by himself, is fully capable not only of adaptation, but of real education. But we recognize that he has no ambition and is by temperament inimical to and suspicious of everything new, so that he is hardly capable of initiative or work of an individual character.

VI. The truth is that whites and half-breeds are too ready to think themselves of another clay to the Indian, and to regard him merely as a creature to be exploited. He is their servant, a more or less willing servant ; he works more often than not against his will, and therefore badly. But if he could speak, what could he not say of the manner in which he is exploited, and above all of the treatment he receives? What would his masters say if they had to put up with one tenth part of all that the Indian suffers without anger, without hatred, without revenge other than a silent inertia and a greater reserve?

Surely the words of Beaumarchais are here appropriate : " Considering the qualities we demand in a servant, how many masters could be valets? "

The Indian is reproached with his drunkenness, his melancholy, and his dirtiness, but these are evils which are not peculiar to him ; they are diseases to be contended with, as others have done, and with success. There is in Bolivia a human capital which may be drawn upon until European or a selected Asiatic immigration shall be established in such regions as are favourable to it. This was well comprehended by

Presidents Montes and Villazon, who, jealous of the prosperity and progress of their nation, resolved to overcome the rooted prejudices of their countrymen by making a serious effort to instruct and civilize the Indian and the half-breed, who is often quite as ignorant.

Already the compulsory military service has yielded surprising results, and we have seen in Chapter VI that an attempt has been made to arouse the native's mind by combining the elementary school with agricultural apprenticeship. This reform, which may solve the ethnical problem if pursued with perseverance, can only be realized very slowly and in the course of time. The native population is so divided into tiny groups and so scattered over the territory that only the larger communities will feel its benefit during the first years of this instruction. With the increase of budgetary resources and the development of means of communication, we may expect serious results.

VII. Besides the Aymara and Quechua Indians there are perhaps 100,000—the figure is entirely speculative—of other tribes, living either in subjection or in a more or less complete condition of savagery. These belong to three great groups: the North-Andean group, including the Mosetenes, Lecos, Tacanas, Yuracares, Araonas, Cavinass, and others; the Pamean group, including the interesting Mojenas and Chiquitanas, who are almost civilized, and the Otuquis and Samucos, who are savages; and the Guaranitic group, containing the Guarayas and Chiriguanas, with the Tobas and Matacos of the Chaco, to mention no more.

Certain tribes are to-day governed by French missionaries subsidized by the Government, who have established important "reductions" at various points, among others those of Cavinass, Parapiti, and in the Chaco. The results obtained prove that with money

and organization the great majority of the Indian tribes could be raised from their poverty and barbarism and united in colonies, where they would be taught agriculture and various crafts and trades, as has been done with success in neighbouring States, and above all in Brazil.

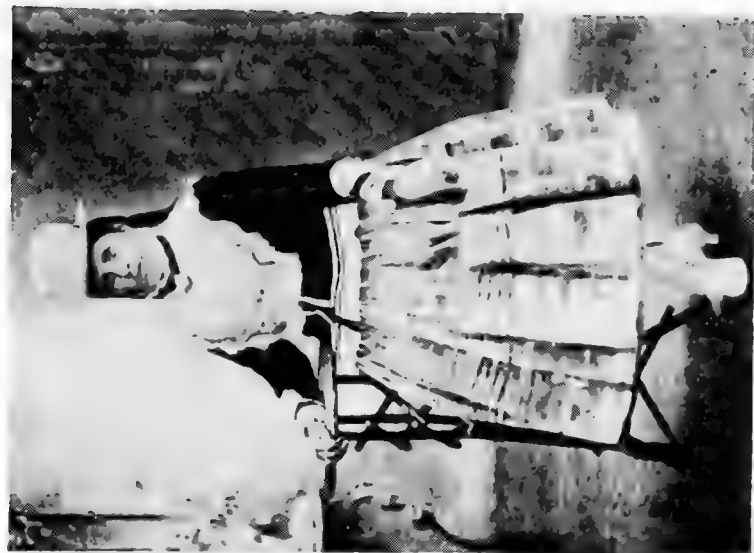
VIII. After the Indian race the most important element of the Bolivian population is the half-breed or *cholo* race (feminine *chola*), which, in obedience to the sociological laws respecting the formation of races, will in time surpass all others in numbers. Born of the fusion of the white and the Indian, the cholo unites the characteristics of both races ; but as the Aymaras and Quechuas form a very tenacious and dominant element in the admixture, the half-breed is commonly, in the first generation, more like an Indian than a white man.

The cholos possess excellent qualities. They are robust and well-built physically ; they are courteous and intelligent, rapidly acquiring all sorts of knowledge ; they are, as a rule, proud and courageous, and, like the Indians, make excellent soldiers. They are good industrial workers ; many become foremen and artisans. But they are also, like the Indian race from which they have sprung, avid of pleasure, with a strong inclination to idleness and alcohol. They profoundly despise the Indians, whose worst enemies they are ; and they have always retained the Indian's timidity or servility toward the white man. Like the Indians, they are often lacking in energy, will-power, and commercial or agricultural initiative.

The cholos, except in the poor and backward classes of society, are in no wise distinguishable, as to costume, from the white inhabitants. The women, or cholas, many of whom are extremely pretty, are generally well made, with small hands and feet ; their costume is conspicuous and characteristic. The cholas of the more well-to-do classes are always ex-



A CHOLA TYPE, LA PAZ.



A CHOLITA.

tremely well shod, wearing high-laced boots with high heels, made of leather soft as a glove and of a light shade. These boots show off the foot and a shapely leg, clad in well-fitting stockings. The head is protected by a round hat of whitish felt, two black tresses falling down the back. On the shoulders they wear light shawls, white or of some bright colour, of silk or other material, which covers a low-cut bodice worn over a short white pleated skirt, beneath which is a white petticoat edged with lace, which is slightly longer than the skirt. As the skirt is gathered on the hips, which are thus enlarged, and the bottom of the skirt is weighted, it sways as the wearer walks like the skirt of a dancer. The whole costume has a rather pleasing effect.

The cholas of the lower classes wear the same hat, the same coiffure, and a skirt of heavy woollen stuff, gathered on the hips, but no laced petticoat. The legs are bare and the feet are shod with sandals or cheap shoes.

Hygiene is not always respected by the half-breeds of the lower classes, who are very superstitious. They bathe, it seems, only on odd dates, and more particularly on the 9th, 17th, or 21st, otherwise they would be ill the rest of the year ; and one must never take more than twenty-one baths in the year, or the same result would follow.

The cholos are in the minority in the country districts, but live, as a rule, in the towns and cantons. Since they have participated directly and ardently in politics, they profess to live, if not for, at least by the State, and have a perfect passion for bureaucracy. In the towns and capitals the cholos more especially enter the Army and the Church, and lately have also become schoolmasters. There are very distinguished men among the half-breeds, whose degree of education varies. At all times this class has furnished really remarkable statesmen and writers of talent.

On account of the many crossings which have taken place, and are still taking place, it is not always possible, without great perspicacity, to distinguish a member of the white race from one of the superior classes of half-breeds. All Bolivians are very much alike physically, and the singular yellowish tint to be observed in the cornea of the mixed race, a noticeable and tenacious characteristic of the Indian, and one that often persists to the third and fourth generation, at last entirely disappears. The colour of the skin is not a certain indication, for it depends upon the local conditions.

We are of opinion, and many agree with us, that the future of the half-breed race is henceforth assured; that in years to come, when it is still further improved by the admixture of fresh blood, it will play a very prominent and active part in the national life. Already the half-breeds, who are more numerous than the whites, and almost as numerous as the Indians, are beginning to accumulate capital and to fill important posts in commercial houses. A half-breed aristocracy is in process of formation, which, when it is more numerous and more wealthy, when it has lost a little of its indolence and timidity, and has acquired a greater initiative and a more serious education, will no longer be content to take a secondary place. Little by little—and examples already exist—it will assume the direction of the great industrial and commercial undertakings, and we shall see it consolidating its numerical and financial superiority by assuming the political direction of the country, to the detriment of the whites.

To sum up: the mixed race, which forms the basis of all the populations of South America, is the crucible whence the homogeneous race of the future will issue.

IX. The whites, descendants of the Spaniards, constitute the ruling race of Bolivia. But the aristocracy

of blood is practically non-existent. Many boast of an absolute purity of blood, maintained through the centuries, but for one case where such a pretension is justified there are a hundred where it is not, and the majority have always a little Indian blood in their veins, but this is not a taint. If by chance a few families have escaped any admixture of blood, the influence of climate, and the manners and customs of their environment, have modified them until they are no longer to be distinguished from other families of less pure origin.

The Bolivians of white race, whether dashed or not with Indian blood, are extremely civil, courteous, and hospitable to the stranger within their gates. Affable and correct in the social relations, they rarely employ the violent interjections in which the Spanish language abounds.

Bolivian children are docile, of quick intelligence, and in general studious and anxious to learn ; but the great indulgence with which they are treated sometimes spoils the young man, making him irritable, authoritative, and a trifle despotic. His studies once completed, he is apt to relapse into an atavistic indolence. Beyond politics, which for personal reasons excites a certain interest, the young Bolivian is little given to enthusiasm, and is unable to interest himself keenly in a given object. The ambition of the majority is to obtain some form of employment, which they think they have a right to expect from the State, or some municipal appointment which will enable them to live in peace. It is hardly surprising that foreigners have profited by this spirit and have monopolized the best commercial and industrial positions in the State.

The men marry early in Bolivia : at twenty, or even sooner. The young girl lives a very secluded life up to the day of her marriage, and once she is a mother she sees little more of modern life than she

did before marriage. Her life is devoted to the education of her children, and she seldom leaves the house.

The customs and usages of the Bolivians of white race are those of all the Hispano-American peoples, and do not very widely differ from those of the French. In the matter of dress both men and women follow with close attention the evolution of the European fashions, which they adopt without hesitation. Even in the aristocratic circles, however, the ladies have not quite abandoned the use of a kind of black mantilla, known as the *veronica*, which is like the *manto* of the Chilians, and is becomingly draped over the head and bust.

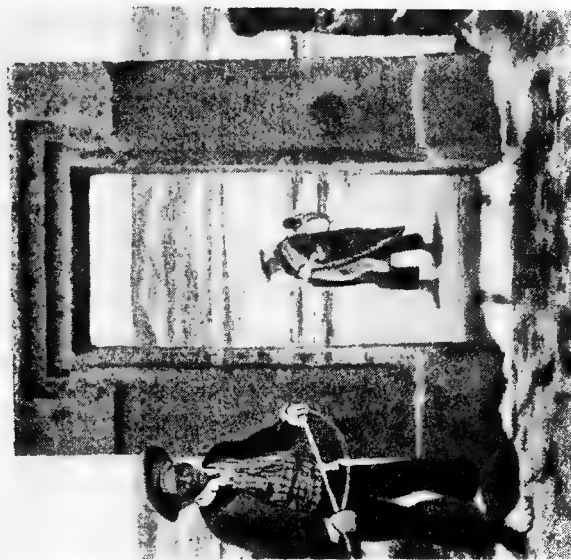
At the more fashionable social gatherings the European dances are in favour, but the middle classes, while addicted to the European dances, have not lost their affection for the gracious and picturesque dances known as *bailecitos de tierra*, or dances of the country, in which as much grace as agility is called for. The women of La Paz have the reputation of equalling the Chilian and Peruvian women, who are past mistresses in these dances.

In the chief towns of Bolivia there are small social groups, not easy to enter, composed of persons in whose veins the Spanish blood is almost unmixed. These groups, in which a simple good-breeding prevails, are united by affinities of taste and education, and often by relationship as well. This aristocracy, so to call it, still enjoys a certain prestige, although it is sometimes reproached for refusing to welcome the new chola or half-breed families, which hope to storm a much-desired position by their wealth and luxury.

Vanity is a Latin-American defect, and especially prevalent in social groups of recent formation ; however, the old families are by no means deficient in it, and regard with indignation the attempts of half-



INDIAN HOUSE, TIAHUANACU.
(Built with stones from Incaic ruins.)



A RUINED DOORWAY, TIAHUANACU.

breed society to dazzle their world by a more or less vulgar and disorderly luxury. As in all South American societies, many persons will deprive themselves of the most elementary comforts in private life in order to make a brilliant appearance in public.

Private houses, which, but for exceptions now increasingly frequent, are generally ancient, are not of striking appearance without, but are well furnished and fairly conveniently arranged ; the greatest sacrifices are made for the sake of the salon, and this room is almost always luxuriously furnished, even when the other rooms are more than simply furnished.

Bolivia has few such colossal fortunes as exist in the Argentine and the United States. There are, however, a few multimillionaires, and a sprinkling of millionaires, but as a rule fortunes are limited, having hitherto, owing to a lack of initiative, had little opportunity of expansion, and many citizens are spoken of as very rich men who possess a mere ten thousand pounds or so. On the other hand, except among the Indians and the lowest class of half-breeds, who cannot or will not save the product of their toil, there is no absolute poverty ; all who work have something and can easily acquire more.

CHAPTER XI

THE DEPARTMENT OF LA PAZ

- I. General summary. Lake Titicaca.—II. The thirteen provinces. Their climate and special products.—III. A fertile and picturesque country. The Yungas : how to reach them. Impressions.—IV. Various crops and small plantations.—V. Other products : the coffee, cocoa, and sugar of the Yungas.—VI. The true wealth of this country : coca. Its use.—VII. Annual yield and export.—VIII. The coca shrub ; how cultivated ; its parasites ; duration of a plantation.—IX. Plucking ; preparation ; profits. A flourishing culture.—X. Labour. The Indian of the Yungas.—XI. The value of a hacienda. The Yungas from the immigrant's point of view. Their future.—XII. From the Yungas to La Paz.—XIII. Principal towns of the department.

I. WE have seen that Bolivia is divided into eight departments and two colonial territories, counting as such the province of the Gran Chaco (constituted a Delegation since 1905). We will rapidly glance at all, and first at the department of La Paz, which is remarkable for the variety of its products.

The animal kingdom is represented by great flocks of llamas, alpacas, and vicunas, herds of cattle, horses, and flocks of sheep and goats. The vegetable products include coca, cotton, cocoa, bananas, sugar-cane, oranges, lemons, cereals, potatoes, various vegetables, timber, and valuable gums (used for varnishing purposes). The mineral products include gold, silver, copper, tin, rock-crystal, very fine marbles (including certain white marbles which are almost transparent), etc.

With the exception of the Territory of Colonias, La Paz is the most northerly department of Bolivia. Its area is 72,970 square miles ; it occupies the third place in respect of territorial importance, but is the first as regards population, counting nearly 500,000 inhabitants. Its landscape and its general character display a great variety, for the highest altitude is 23,990 feet and the lowest 639 feet. The climate is naturally very different in different regions, as will be seen from the brief data which follow, relating to the thirteen provinces which compose the department.

II. Murillo (called Cercado until 1912), whose capital—a recent creation—is Villa Obrajes, which lies not far from La Paz. The surface is mountainous and uneven. The climate is varied. Special products are llamas, alpacas, fruits in the valleys, gold, etc. Watered by the Rios La Paz, Palca, Zono, and Unduavi.

Pacajes (capital, Corocoro, which lies some 78 miles from La Paz). Surface, flat and even. Climate, cold. Products, alpaca, salt, copper, lignite. Watered by the Desaguadero and its affluent the Mauri, and bordered by Lake Titicaca.¹

¹ This lake, the highest navigable sheet of water in the world, lies 324 miles from the coast at a height of 13,861 feet. It runs obliquely across the Bolivian table-land, dividing into two portions below the 16th parallel ; the northern portion, the real Titicaca, also known as Chicuito, is the larger, and communicates with the southern portion, known as Huinamarca, by the strait of Tiquina. Titicaca has an area of some 3,210 square miles, while its greatest length, from the mouth of the Rio Ramis to a small creek near Aigachi, is 120 miles, and its greatest width varies from 34 to 44 miles. Its average depth is about 330 feet, but there are depths of 984 feet, while in the shallower portions (not counting the shores) there are soundings of 100 to 200 feet. The lake presents a rather mournful appearance ; steep mountains hem it in with a wall of yellowish green, save in the south, where there are low shores, here and there cultivated, although the traveller is unlikely to see the dwellings of the cultivators, which are scattered very sparsely along the

Omasuyos (capital, Achacachi, which lies 69 miles from La Paz). Surface, mountainous to the east and flat in the west. Climate, cold. Products, alpacas, fish, lignite. Watered by the Kaka, the Aigachi, and bordered by Lake Titicaca.

Nor-Yungas (capital, Coroico, which lies at an altitude of 6,494 feet, and at a distance of 93 miles from La Paz). The surface is very irregular, and is watered by the Rios Beni, Bopi, Coroico, and Tamampaya. Climate, varied, semi-tropical, and damp. Products, coca, cocoa, and gold. There are great forests.

Sur-Yungas (capital, Chulumani, which lies 5,432 feet above sea-level, and 93 miles from La Paz). Surface, extremely mountainous. Climate, semi-tropical and damp. Products, coca, gold, forests.

Larecaja (capital, Sorata, which lies 8,988 feet above the sea, and 97 miles from La Paz). Surface, mountainous. Climate, semi-tropical, varied, and damp. Products, cereals, rubber (hevea), quina, fruits, gold, cobalt, timber, etc. Watered by the Rios Beni, Keka, Coroico, Mapiri, Tipuani, Challana, etc.

Muñecas (capital, Chuma, 145 miles from La Paz). Surface, irregular. Climate, temperate ; varied and damp in the north. Products, cereals, rubber, coca,

banks. Titicaca forms a number of peninsulas, capes, isthmuses, and straits, and 43 islands, of which the larger and more celebrated are the Island of the Sun or Titicaca, Coati or the Island of the Moon, Amantani, Campanario, Taquiri, etc. From this lake issues the Desaguadero, the most important river of the high Bolivian tableland, which, running towards the south, falls into Lake Pampas Aullagas or Poopo, after a serpentine course of 260 miles. Lake Poopo, which is 22 miles wide and 44 miles long, with an area of 1,374 square miles, has two islands, Panza and Filomena. This lake, which lies in the department of Oruro, has only one known outlet, the Rio Laca-ahuira, which at intervals loses itself in the sands, to reappear, and finally to be lost, in the marshy lagoon of Coipasa.

gold. Its rivers are the Rios Camata and Consata, which form the Mapiri.

Caupolican (capital, Apolo, 5,248 feet above sea-level, and 283 miles from La Paz). Surface, irregular in the south, flat in the north. Climate, tropical and semi-tropical ; damp. Products, cocoa, quina, fish, turtles, gold, petroleum. Watered by the Beni and its affluents, the Madidi, Tuicha, etc.

Sicasica, the old capital of which bears the same name, and lies 12,560 feet above sea-level and 80 miles from La Paz. The new capital is Aroma. Surface, flat in the west and mountainous in the east. Climate, cold. Products, tin, silver, gold ; sheep and llamas. Watered by the Desaguadero and its affluent, the Viscachani.

Loaiza (capital, Luribay, which is 87 miles from La Paz). Surface, irregular. Climate, varied and rather dry. Products, wines and fruits of all kinds ; gold and tin ; thermal waters. Watered by the La Paz, Luribay, and Caricato.

Camacho (capital, Puerto Acosta on the Titicaca), and Ingavi (capital, Viacha, 15 miles from La Paz), are two provinces created in 1908 and 1909.

Inquisivi, with a capital of the same name, which lies 140 miles from La Paz. The surface is uneven. The climate is damp and varied. Products, valuable woods, coca, gold, tin, wolfram. Thermal waters at Aputana and Legue. Watered by the Rios La Paz, Miguilla, and Suri. Cochabamba, Lambaya, and Cotacajes. This last province forms part of that region of the Yungas which is with reason considered as the most beautiful, the most picturesque, and the most fertile of Bolivia. It deserves a few words of description to itself.

III. We have already seen that the name of Yungas is given to the low and enclosed tropical valleys which lie to the north of La Paz among the spurs of the Royal Cordillera, between the altitudes of 5,000 and

2,500 feet, and whose waters run toward the Amazon by way of its upper affluents. The most interesting are those which are divided administratively into the North and the South Yungas ; these provinces stretch northward as far as the province of El Beni, and are traversed by the Rio de la Paz, which, swollen by many others, becomes the Rio Beni at the confluence of the Cotacajes and the Altamachi. This is one of the principal highways by which Bolivian rubber finds its outlet to the Amazon.

The Yungas, part of which we visited, attract the traveller by their reputation of abundance and their proximity to La Paz, for their capital towns are distant only 80 and 93 miles respectively ; but the journey is rather difficult, and the most elementary comforts are lacking. To penetrate this region, which Orbigny compared to a lost Paradise, one is obliged on the first day to cross the huge range of the Eastern Andes, whose summits are clad in eternal snows and whose flanks are teeming with mineral wealth.

Leaving La Paz by the Via de las Yungas, in the suburb of Santa Barbara, one follows the ravine of Chuquiaquillo, and then, turning to the north, one climbs without a break to the little pass or *apacheta* of Huacuyo, 15,338 feet above the sea. This is the highest point of the journey. Thence the track descends, winding through many zigzags, as far as Rinconada ; if one wishes to avoid these detours as far as Pongo one may take the mule-track, which is shorter by three miles, but the gradient is sometimes as high as 30 in 100.

On the second day one enters an interminable defile among the mountains ; the track is cut in the rock, following all its sinuosities, and is always perched at a height of many hundreds of feet, sometimes as many as 3,000 ; at certain points it actually overhangs the floor of the valley of Chuc'ura at a

height of 5,000 feet or more. The Chuc'ura is a river flowing into the Rio Coroico, which itself flows into the Rio de La Paz. Towards the end of the second day one begins to notice banana-trees and coffee plantations, in a locality named Bella Vista. The plantations of coffee, bananas, cocoa, are continuous all along the valley of the Chuc'ura, but they are as a rule quite small plantations. It is only on the third day that one reaches the torrid valley, after three hours of an extremely steep descent, which leads one to the bottom of the Chuc'ura Valley. For some time one skirts the river ; then, after many ups and downs, and after fording three rivers, the Chairó, the Elena, and the Chuc'ura itself, one finds oneself at the foot of the mountain on which is built, like a condor's nest, the little town of Coroico ; to be reached only by climbing for two hours up an almost perpendicular track on mule-back.

The region of the Yungas deserves to be more frequented than it is by the inhabitants of La Paz, who have every excuse for praising it ; the country is incontestably beautiful, and all who make the journey thither retain a vivid memory of it. Sometimes all is of a wild, even a savage natural beauty, whose dreadfulness is happily attenuated by the exuberant vegetation which clings to the flanks of the rocks and masks the profundity of the abysses ; sometimes, in the valleys, there are smiling landscapes gay with banana and orange trees. The mere aspect of the country, always interesting and often most impressive, fully repays the traveller for the fatigue and the few inconveniences of which we shall presently speak.

IV. On the whole of the high table-land the word Yungas is a synonym for incomparable natural abundance ; these valleys are spoken of as a privileged region, above all from the agricultural point of view, and as a great future centre of colonization.

From what we ourselves had heard we expected to find there many large plantations of coffee, cocoa, sugar-cane, and other tropical products. It was not so ; we saw but few really important properties ; among which we may mention the hacienda of San Pablo, which lies on the road from Coroico to Chulumani in the South Yungas ; this is the home of the largest cocoa plantations.

It is true that the Yungas produce, and in wonderful abundance, coffee, cocoa, and sugar-cane ; the cotton grown there is remarkable for the fineness of its fibre, and the same is true of Angora wool. Other products are manioc, oranges, lemons, bananas, avogados, and other tropical fruits ; but nowhere are there real plantations such as one sees in Brazil. To be sure, the products we have named are cultivated to a certain extent almost everywhere, but always on a very small scale. They are not, one might almost say, seriously cultivated ; they are allowed to grow almost at hazard, and without care. It is annoying to see such fertile soil yielding so little.

V. Thus the coffee, although it is of a superior quality, possessing to a great extent the aroma and delicacy of the Mocha bean, has hitherto been quite a secondary product. The coffee-trees were and are still used to enclose other crops ; they form hedges along the roads or round the coca plantations. Only during the last few years have a few actual plantations been made, and those are as yet of no great size.

The coffee-tree of the Yungas gives a crop between the ages of twelve and eighteen months, but it is only about the fourth year that it gives a really good yield. It will then bear abundantly for fifteen to twenty years, according to the soil and the climate. A well-grown coffee-shrub should produce an average of three to eight pounds of coffee annually. In the Yungas maturity is not simultaneous ; the harvest

may therefore be gathered two, three, or four times a year, as the berries become ripe. Unfortunately the gathering of the crop is effected very carelessly. The Indians, to save themselves trouble, pick both the ripe and the green berries at once, and the loads of coffee which reach La Paz in the raw state are unequal in quality and are not even graded ; however, they fetch a fair price.

Cocoa also is grown in the Yungas, and is prepared at Apolobamba, yielding the well-known chocolate of that name. It grows wherever it is planted ; in the depths of the valleys or on the banks of the streams ; but it apparently receives no more care than the coffee, and is not cultivated in a methodical manner.

Everywhere there are numerous plantations of sugar-cane. The sugar of the Yungas is remarkable for its powers of crystallization ; but it is mostly used to produce a spirit known as *canazo*, which finds many and eager customers among the Indians of the neighbourhood. Here, again, the plantations are all small ; in the Yungas a plantation of 75 acres is regarded as a very large one.

In the same way manioc, oranges, bananas, etc., are cultivated everywhere, but almost exclusively for the needs of the natives, except that a certain amount of fruit is sent into La Paz. Every Indian dwelling is surrounded by a small field of manioc and little orchards of oranges and bananas, giving a charming and picturesque impression.

As for the cultivation of quinine, it is almost extinct, owing to the low price of the product, due to the great yield of the Asiatic plantations, in Java, India, and Ceylon. There are still many plantations of quinquina which might perfectly well be exploited, but the owners do not trouble to work them, for the cost of transport to the coast might almost exceed the value of the product itself. In 1911 Bolivia

exported only 42 tons of quinquina, its value being £3,229.

VI. So far there is only one crop which is cultivated to any large extent in the Yungas, namely, coca, but that alone constitutes the real wealth of the country. All the capital and all the labour to be found in the Yungas are devoted to the exploitation of this one crop. Its profits are so considerable that the inhabitants of the valleys neglect almost all the other products of the country.

Coca is the leaf of a shrub which grows in the Andean regions of Bolivia, Peru, and Colombia, and practically nowhere else. From all times the Indians of these regions have consumed this leaf, sometimes in immoderate quantities. They chew the leaf, mixed with a small quantity of what they call *llucta*: a mixture of lime, potato broth, and the ashes of certain woods. The lime and ashes are used as a condiment; the taste of the coca itself is inappreciable. All natives carry a small bag containing a store of coca in the form of small pellets, or *acullicos*; these are chewed as tobacco is chewed.

Many Indians take coca daily in large doses, usually three to six times a day. In most cases the habit is inveterate, and an Indian will go without food rather than without his *acullico*. When abused it produces a double infirmity, due more to the lime and ashes absorbed than the coca itself. One of the cheeks, that in which the quid is held, displays a swelling, known as *piccho*, which finally becomes chronic, and the victim gradually falls into a state of moral insensibility, during which, however, he will continue to march or work; he is then said to be *armado*.

Coca thus used calms and fortifies the system; its chief result is temporarily to paralyse the appetite while satisfying the stomach. With three or four lumps of coca as his sole sustenance the Indian will accomplish labours to which a white man would



CHURCH AT TIAHUANACU, SHOWING MONOLITHS.



INCAIC RUINS, ISLAND OF THE MOON, LAKE TITICACA.

succumb, especially in the high altitudes and the mines situated in the coldest regions of the Cordillera. We have already spoken of the incredible distances which he is able to travel on foot.

VII. Coca is well known in Europe by the alkaloid which is extracted from it : cocaine.

In Bolivia cocoa is cultivated chiefly in the Yungas of La Paz and Cochabamba, and to a less extent in the province of Caupolicán. It is also found in the department of Santa Cruz. The most important centre for the cultivation of coca is in the Yungas of La Paz ; it amounts to 400 tons annually, and the annual yield of the whole of Bolivia had in 1911 attained to 5,400 tons.

This annual harvest of five thousand tons or more is consumed almost exclusively in the country, by the labourers in the mines and the Quechua and Aymara Indians. It is exported in small quantities to the northern provinces of the Argentine and Peru, where, however, it has to compete with the coca of Cuzco. According to the figures of the Bureau of Statistics of La Paz, the exportation of Bolivian coca in 1911 was estimated at only some 252 tons, having a value of £42,284.

Bolivian coca is not exported into Europe in large quantities for the extraction of cocaine, as is Peruvian coca ; yet the Bolivian leaf is richer in the alkaloid. The reason why Peruvian coca is preferred by the European markets is to be found in its low price, which in turn is due to greater facilities of transport. A little while yet, and this superiority will no longer exist. However, as we have seen, local consumption is quite sufficient to absorb the Bolivian harvest.

The country round Coroico, Coripata, and Chulumani is the centre of the coca industry. Here are the principal haciendas, perched on the mountain-sides like castles of the Middle Ages ; many of them

date from the days of the Spaniards. The coca plantations are ranged in terraces on the flanks of the mountains, from summit to base.

Chulumani is 5,533 feet above sea-level ; Coripata, 5,969 feet ; and Coroico, 6,494 feet. These heights form the limit, in the province of the Yungas, of the cultivation of the coca-shrub.

VIII. The coca-shrub is, in the Yungas, a small bush about 36 to 40 inches in height. It reaches this growth in about two years and rarely exceeds it. We have seen bushes 6 or 8 feet in height, but they are the exception.

The leaves of the shrub as found in the Yungas are small, straight, oval, and of a green varying from dark to bright, according to their age. Their average size is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in length and half as much in width. The coca-trees of Peru are taller and the leaf larger, but less rich in cocaine. As a rule, the smaller the leaf the richer in cocaine.

In the Yungas the coca-shrub is planted on the slopes of the mountains in long terraces, called *humachas*, built up one above the other like so many steps of a staircase, each being supported by a little rampart of earth reinforced by stones. These are the work of the Indians, who use a sort of small wooden shovel. In this way the rains, which otherwise would run to waste down the mountain-sides, impregnate the soil and soak the roots of the plants.

In these *humachas* the little shrubs are planted close together, the interval from stem to stem being only six or eight inches. The extremities of the twigs touch and intermingle. The plantations are divided into *catos*, 98 feet square. The shrubs are grown from seedlings, which are also grown in *humachas*. These seedlings are protected by means of grass or straw, and between the sixth and the eighteenth month the plants are taken from the nursery for transplantation.

The *humachas* and plantations are first formed in a rainy season. The wet season lasts from October to March, but there are rains in every month of the year. As a rule the month of August is chosen as being most favourable for the establishment of a plantation. The ground is weeded three times a year.

When a plantation is formed on virgin soil it is first, of course, necessary to cut down the forest, burn the trees and weeds, and dig out and remove the roots and stones. In a good soil the first crop may be gathered eighteen months after plantation, but this crop will not be a large one. The normal yield will begin at the outset of the third year, and in four or five years the shrubs will be in full bearing.

There are three harvests, or *mitas*, a year ; the *mita de marzo* during the first four months of the year, the *mita de San Juan* in the winter, and the *mita de los Santos* toward the end of the year. In very good soil there is sometimes a fourth *mita* during the last months of the year, known as the *mita de San Juanillo*.

When the rains are not sufficient the heat of the sun stimulates the production of the seed, to the detriment of the leaves, and also tends to weaken the growth of the trunk. After a dry season the shrubs will thus be weakened, and to restore them to vigour they are sometimes pruned ; exhausted shrubs are also rejuvenated in the same way.

Pruning, however, is only possible in rich soils, when the shrub is strong. In poor soils it is not allowed, as it is said that the shrub would not bear it. In such soils, if the shrubs grow sickly, one can only leave them to recover in course of time. However, the coca-shrub is very hardy, and it rarely dies before the natural exhaustion of the plantation.

The coca-shrub is sometimes attacked by parasites or maladies of its own. There is the *calla cuto*,

a grub which attacks the roots ; the *ulo*, a butterfly which lays its eggs on the under surface of the leaves ; and the *sarna*, a kind of mildew or scale which forms on the branches. With care and suitable remedies these evils can be overcome.

A coca plantation, in favourable soil, should last fifty or sixty years if properly cared for. With indifferent soil and care its average life will be fifteen to twenty years. The soil is left fallow four to five years before replanting. The soil of that portion of the province of the Yungas in which coca is grown is usually clayey, with regions of varying fertility. The Coripata district is considered the richest.

IX. When the leaves have reached maturity they are plucked by hand. When the *mato*, as the leaf is called, is gathered, the operation of drying is commenced ; this demands a certain care, for if exposed to moisture the leaf changes colour and loses its value. First it undergoes a preliminary drying in a closed drying-chamber, which is known as the *matoasi*, the leaves being spread out on a floor of beaten earth. Thence, on the following day, the leaves are removed and placed on an open drying-floor made of the local slate ; this is known as the *c'achi*. Here the leaves are allowed to dry in the open air for two and a half or three hours. They are then removed and stored in a perfectly dry wooden granary.

When enough leaves are harvested and dried they are packed in bales. Wrapped in banana leaves, or *cojoro*, the coca is pressed in an iron press, or *c'olo*, being put up into bales (*tambores*) of 2 cestos (about 90 lb.) each.

These bales are transported on the backs of mules or donkeys. A mule's load is 2 quintals, or 202 lb., and a donkey's load half as much.

The coca of the Yungas, excepting such as is

kept for local consumption, is all sent to La Paz, whence it is distributed over the high table-land. At La Paz it has to pay entrance duty, and when it leaves the capital for other parts it has to pay an export duty.

The cost of transport from the Yungas to La Paz is about 4s. to 5s. per donkey-load, that being nearly a hundredweight.

The cultivation of coca is extremely lucrative, and forms the chief industry of the population of the Yungas. The profits to be made are roughly as follows :

The bill for labour up to the end of the second year need not exceed £12 per cato of 1,065 square yards. From the eighteenth month there will already be a crop of $3\frac{1}{2}$ to 7 cestos, or 88 to 176 lb.

The normal yield is 12 to 14 cestos—roughly, 300 to 350 lb. ; the price per cesto at La Paz is about 25s. ; the various expenses—packing, transport, etc.—come to about 8s. per cesto. This leaves the planter a net profit of about 16s. per cesto. A cato will thus yield about £10 annually. This is equivalent to a net profit of about £40 per acre.

It will be seen from these figures that it is only natural for the planters of the Yungas to prefer the cultivation of coca to that of any other crop, especially as the sale of the crop is always assured.

X. All the labour on the haciendas is accomplished by Indians. These are either day-labourers at a shilling per day, or colonists settled on the land.

The colonist is given an allotment of land by the proprietor. There he plants coca, and, for his own support, banana-trees and manioc, which latter is the staple diet of the natives. In exchange for the land thus given, the colonist owes the proprietor a certain number of hours in the week, on Mondays, Tuesdays, Wednesdays, and Thursdays. He is

entirely free for the rest of the week. He can always be replaced by another, say by a son, and the day's work is very short.

Every colonist cultivates a few *cestos* of land, and from this, thanks to coca, he can, if at all industrious, realize quite a decent profit. Colonists who make £120 a year by the sale of coca are by no means rare. And they have no wants to speak of. They live almost entirely on dried meat, manioc, and bananas. Obviously the condition of the Indians of the Yungas is infinitely superior to that of the Indians of the plateau.

From the physical point of view also they are greatly superior. The Indians of the *puna* are short, with clumsy limbs, harsh features, and a glance which often expresses distrust of the stranger. The Indians of the Yungas are slender and erect, with fine features, an easy gait, and a pleasant expression. Although a little shy, they do not dislike strangers, and when they meet one on the mountain paths they always salute him with a "God grant you long life"—*Dios aski uruchurata*.

This should, it would seem, be a happy race; but, like the other races of Indians, it is rotten with drunkenness. All the Indian's money goes to buy alcohol, and in meeting the expenses of the religious festivals which are the occasion of so much drunkenness.

Labour is not plentiful in the Yungas. The population of the two provinces is only some 30,000 (13,736 for the North and 16,110 for the South Yungas). The value of a hacienda is estimated according to the number of colonists settled upon it.

The great preoccupation of the planter is, therefore, to keep his colonists. Good treatment is quite enough to ensure the desired effect. When he is well treated the Indian remains where he is, but if he has reason to complain he departs. A victim of

bad treatment, he silently leaves the hacienda, settles elsewhere, and is seen no more. A hacienda may thus gradually be emptied of its workers, and, from a valuable property, may become worthless.

The larger haciendas in the Yungas have 90 to 100 colonists settled upon them ; those of average size, 40 to 50.

The administration of a coca plantation is entrusted to a major-domo, paid at the rate of £80 a year. He also has the use of a house and an allotment of land. The owner must have absolute confidence in him, for he is virtually the master of the hacienda all the year round, and directs the harvests and the packing, transport, etc.

The owners of the coca plantations do not live in the Yungas. They confine themselves to drawing the revenues of their plantations. The most energetic of them will leave La Paz once a year and pay a short visit to their haciendas, in order to glance at the property, make sure that the buildings are not too ruinous, and satisfy themselves that there are no absolutely urgent repairs to be made. This negligence and absenteeism is due in part to the difficulty of the roads, and more generally to the absolute lack of the most elementary comfort in the Yungas. The owners also limit themselves to the most indispensable repairs, as the smallest piece of work, when it necessitates sending men and materials from La Paz, will cost a considerable sum of money.

XI. Despite the methods of working, it is a fact that the coca plantations of the Yungas yield very good profits. At normal prices the purchase of a good coca hacienda constitutes a safe investment, yielding 10, 12, or 15 per cent.

Sometimes haciendas are offered for sale by owners who wish to be free of the care of supervising so distant a property ; but such opportunities do not occur every day. In any case, an investor who

intended to buy a coca plantation should live in La Paz, or at least find a trustworthy representative in that city.

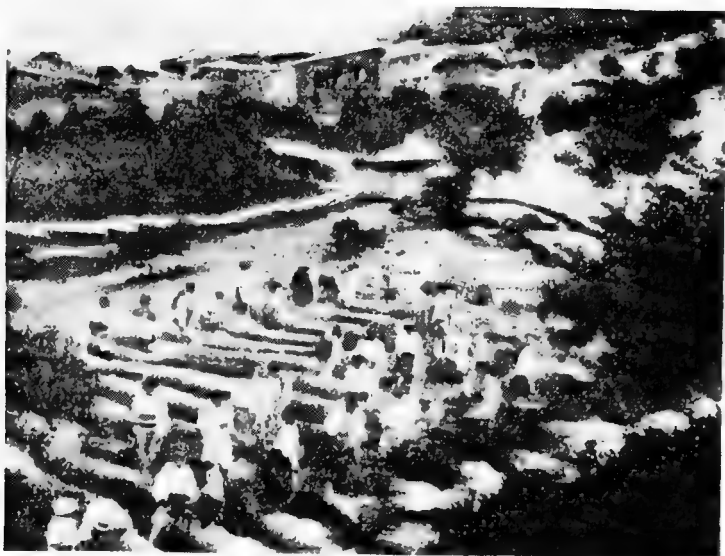
A good hacienda provided with 40 to 50 colonists may be worth £8,000. The larger haciendas, with 90 to 100 colonists, are valuable in proportion.

It will be seen that the culture of coca does not at all resemble the vast cultures of other tropical products which are to be seen in other countries. On each hacienda only a few acres are planted with coca; none the less, coca is one of the most important products of Bolivia, and, on account of its various medical and surgical applications, the market can only increase year by year.

Could European colonists settle in the Yungas? We are sure of it. The climate is not an obstacle; it is hot, but not unhealthy. Although there are fevers in the valleys they respond readily to treatment, and the heights are healthy.

But it must be understood that as things are at present European immigration is hardly possible; nothing is ready to receive immigrants. Before European immigrants could settle in the Yungas the Government should purchase large tracts of good soil, and divide them into colonies, arranged in a certain number of lots. Once on the spot, the colonists should be able to count on the aid and encouragement of the Government during the first few months, as is the case in Brazil. An experiment of this kind might well be tried, for the products of this region will always ensure certain profits.

In this country of narrow valleys, where the crops must be grown on the slopes of mountains of varying steepness, the development of the native population seems to us preferable to and easier to accomplish than the establishment of a great current of immigration. What the Yungas lack is decent roads. The railway now building between La Paz and the Yungas



A COCA PLANTATION.



AN INDIAN OF THE YUNGAS.

and thence to El Beni should make this region one of incalculable value.

At the present time half the population of the Yungas is employed in the transport of coca. If this transport were effected by rail thousands of hands would be restored to agriculture, and the yield of the Yungas would soon be doubled. We should then see other tropical products exploited as well as coca. This country could easily feed the whole of the central plateau of Bolivia at the very least. The best one can hope for this fertile and picturesque region is the speedy completion of the railway.

XII. In the meantime, in default of the railway, it is on muleback that one returns to La Paz. After leaving Chulumani, one returns by another road as far as the point where the Cordillera was crossed on the journey out ; this time the mountain paths overhang the Rio Unduavi. There is little to be noted on this journey save the crossing of the Tamampaya, which river must be negotiated on the route from Coripata to Chulumani, two hours past Coripata. This river is easily crossed by fording during the dry season ; but during the rains, which were still falling at the time of our journey, it becomes an impetuous and impracticable torrent, and must be crossed by means of an *oroya*, an elementary device consisting of a wire rope, to which one clings with one's hands, and two other cables hung at a lower level, on which one sets one's feet, or a plank serving as a seat ; one then advances, hauling oneself along with the hands. This somewhat acrobatic exercise is one to which we had often been forced to resort during our previous journeys in Amazonian and other regions, in order to cross rivers and torrents of far greater importance, the *oroyas* being of all degrees of perfection.

The railway will put an end to these journeys, which make the unpractised traveller dread the diffi-

culties of an excursion into the mountainous tropical or semi-tropical regions of Bolivia. For a beginner the journey through the Yungas, like any other journeys of the kind, cannot be regarded as a pleasure trip. These journeys are made entirely on muleback—a fatiguing mode of progression, for beyond the eastern Cordillera there is nothing but mountains and ravines, with a succession of climbs and descents, the steepness of which is often incredible. The roads are merely mule-tracks, practicable only for beasts of burden, often hewn out of the rock, and are badly kept, except here and there where they are dependent on some active and far-seeing municipality ; and the mules slip and stumble on the stones, which they strike at every step. There are many descents on which it is more prudent to dismount.

On the route into the Yungas, which struck us as comparatively practicable, accidents are rare ; those we were told of were due chiefly to the negligence or imprudence of travellers. The track is always wide enough for two laden beasts to pass ; a necessary precaution, for one constantly encounters troops of mules, asses, or llamas bearing coca or fruit to La Paz or returning from the city with loads of various kinds. Despite these few drawbacks, the road to the Yungas passes for being one of the best in Bolivia ; it is certainly greatly superior to the roads leading to the rubber regions, the Territory of Colonias, or to the northern portions of El Beni (and notably than the road to Mapiri), which are truly bad at any season.

Many of the most beautiful and fertile regions in Bolivia suffer from this state of affairs ; but, like the Yungas, in the course of time they will see the advent of the locomotive, and of the population which they need for their exploitation and development.

XIII. We need not describe the chief centres of population of the department of La Paz. After the capital, of which we have already spoken, they consist of the chief towns or capitals of the provinces, as well as certain cantons and vice-cantons, which are more often than not merely villages of modest proportions. Only a few of these capitals have the title of cities; these are Corocoro, Sorata, Achacachi, Coroico, Chulumani, Irupana (the second section of the South Yungas), and Viacha. Only Aroma, the chief centre of the province of Sicasica, has the status of *villa*; the others are only cantons or vice-cantons.

Among these centres Viacha, Corocoro, and Sorata are the most important as regards their population, which numbers many thousands. Sorata, capital of the province of Larecaja, and 97 miles from La Paz, was formerly a very important city, but in 1781, at the end of the revolt of natives headed by Tupac-Amaru, the entire male population (more than 4,000 men) was massacred by the Indians, who, to the number of 100,000, diverted the rivers and made an enormous reservoir, the waters of which, released upon the town, swept away all that was in their torrential course and left nothing but the vestiges of a city behind them. Since then Sorata has never reconquered its ancient prosperity. It is, however, a pretty little town, in a picturesque situation, and is prospering. Its climate has rightly a great reputation for salubrity, and the doctors of La Paz send convalescents thither.

Towns deserving of special mention are: Copacabana, the "blessed city," noted for the sanctuary of Our Lady of Copacabana, a miraculous Virgin, which yearly draws thither great numbers of pilgrims, coming from Peru, from all the departments of Bolivia, and even from the Argentine and Chili. The walls of the church, loaded with ex-votos, jewels,

and other objects of value, give one some idea of the faith of these pilgrims.

The city, which is highly picturesque, is spread about the sanctuary on an eminence which forms the peninsula of Copacabana, at a short distance from the frontier of Peru, facing the peninsula of Tiquina, whose straits marks the frontier. Magnificent temples already existed on this spot in the time of the Incas, where an idol of blue stone was worshipped.

Excepting the capitals of the departments, the title of "city" must not be taken as conveying the idea of large and populous communities; the majority of the "cities," or *villas*, in the interior of Bolivia are towns or large villages rather than cities, as we understand the word; so that we must not be astonished when we find that a centre regarded as important has really less than 5,000 inhabitants. Many capitals of provinces have no more; many have less. In Bolivia, as in other South American countries, all is relative, and all centralizations and official divisions are more or less theoretical; so that the map of such a country will often give one erroneous ideas as to the importance of its towns, which are often separated by tracts of country almost impassable by reason of the lack of roads.



PENINSULA AND CITY OF COPACABANA.



A CORNER OF SORATA.

CHAPTER XII

DEPARTMENTS OF CHUQUISACA, POTOSI, AND ORURO

I. Chuquisaca. A summary glance.—II. Sucre. The city and its inhabitants.—III. Hotels, prices of provisions, salaries, salubrity.—IV. Isolation of Sucre and the department. The future railway. Present means of communications.—V. The department of Potosi ; its landscape ; its vegetation ; *tola*, *quenua*, and *yarela*.—VI. The provinces.—VII. Potosi. A glance at the city.—VIII. The climate ; cost of living ; the industrial movement.—IX. The Cerro of Potosi ; its wealth ; the future of the surrounding region.—X. Other localities. Tupiza.—XI. Department of Oruro. A rapid glance.—XII. The city of Oruro.—XIII. Its industrial development. The mining industry. The cost of provisions. Fuel. Workmen's wages.

I. THE department of Chuquisaca is situated between those of Potosi, Santa Cruz, Cochabamba, Tarija, and the Rio Paraguay. It has an area of 37,195 square miles, more or less, its boundaries being as yet ill-defined ; and its population is about 240,000.

The surface of this department, after reaching an altitude of 13,450 feet with the summits of the Cordillera, dips to a level of 285 feet in the plains ; it contains, therefore, the greatest variety of climates, and, like the department of La Paz, all kinds of products. The climate of the province of Cinti, for example, is noted for its mildness, and this portion of the department is extraordinarily fertile and is favour-

able to the vine. The eastern region of Chuquisaca is in general low-lying, and contains many plains which become swamps during the rainy season. Here one meets with nomad Indians. In the west the land lies higher, is more uneven, and more healthy.

More particularly in the western portion of the department there are mines of gold, silver, iron, copper, lignite, petroleum, and marble. The other portion is given over to the cultivation of wheat, potatoes, rice, and sugar-cane, and also fruits, those of temperate climates as well as tropical. This same region also grazes vast herds and flocks of various animals.

The department of Chuquisaca, which was divided into four provinces as lately as 1912, now includes five, the province of Cercado having been divided. The provinces are :—

Oropeza, whose capital, Yotala, is 10 miles from Sucre, the legal capital of Bolivia. Soil uneven; climate and products varied. Crossed by the Rios Pilcomayo and El Grande.

Yamparaez has a new capital, Tarabuco, 40 miles from Sucre.

Cinti is a province divided into two sections. The capital of the first section is the *villa* of Camargo, 157 miles from Sucre. Soil varied; many products, notably the vine. Well watered by the Rio Pilcomayo, the Camblaya and its affluents, the Cinti, San Juan, and Pilaya.

The province of Tomina contains three sections. The first has for its capital the *villa* of Padilla, 128 miles distant from Sucre; the second, Tacopaya, 72 miles distant; and the third, Pomabamba, 96 miles. Surface mountainous, climate varied, hot in the low-lying portions. Products corresponding to the climate. Stock-raising and agriculture of a tropical type. Rivers, the Guapay and its affluent the Acero, the Pilcomayo, etc.

Azero has for capital Monteagudo, 222 miles from Sucre. Surface mountainous to the west ; flat in the centre and east. Climate varied, hot in the plains ; products varied ; petroleum ; rivers the same as in the province of Tomina, with the addition of the Parapiti.

II. Sucre, the capital of the department, lies 318 miles from La Paz in a straight line and at an altitude of 9,328 feet above sea-level. Founded in 1529 by one of the companions of Pizarro, on the site of Choquesaka, an ancient Indian city, Sucre was successively known as La Plata, Charcas, and Chuquisaca. The first of these names was derived from the numerous traces of silver found in the region, and above all from one famous mine of this metal, situated in the Porce mountain, whence the Incas drew immense quantities of treasure. Its last name was given it after the War of Independence, in honour of Marshal Sucre, the companion of Bolivar, and the first President of the Republic.

The city is built near an arm of the Pilcomayo, in the midst of the mountains, on a plateau which is fairly level but is traversed by four ravines, all of which open toward the Quirpinchaca ; these ravines are crossed by nineteen solidly built bridges. The topographical position of the city is determined by the two heights which overlook it, Sicasica and Churuckella, notable as the crest of the watersheds of the Amazon and the Plata.

Sucre has a population of 24,000, among which there are about 450 foreigners, the majority Spanish. The streets of the city are straight, wide, and very clean ; they are still, for the most part, paved with pebbles taken from the bed of the neighbouring river ; the sidewalks are flagged.

Most of the houses are well built, and have pretty gardens, in which nearly all the European fruit-trees are grown ; as a rule the houses are of one story only,

but they are well arranged, and always contain a little court, or *patio*, with its little stream of water or fountain.

Sucre is really a very pleasant town, and its position adds to the cheerful aspect of the whole. The suburbs are full of pretty country houses ; the valleys are well cultivated, and produce an abundance of wheat, oats, barley, potatoes, and fruits of all kinds.

The city possesses eight plazas. On the principal plaza stands the cathedral, and beside it the Palacio de la Nación, which was formerly the palace of the archbishops. This plaza is known as the Plaza del 25 de Mayo. Other public buildings are the Legislative Palace, the churches of San Francisco and San Miguel, which are very richly decorated ; the theatre " 3 de Febrero," a pretty market-house, the Medical Institute, and the Santa Barbara Hospital. One should visit the park or promenade, with its two monumental entrances, between which is a fine and lofty column. The Banco Nacional de Bolivia and the Banco Argandona occupy important buildings. There are fine private dwelling-houses, for Sucre has many capitalists, wealthy mine-owners, and large landowners.

The inhabitants, doubtless proud of their prosperity, seem a trifle proud and haughty, as are the Castilians, with aristocratic tendencies. There are still extant in Sucre certain social distinctions which have completely disappeared in La Paz, where the most perfect equality prevails. But all this, once one has been introduced, is mitigated by a courteous affability. The women are sympathetic in appearance, some are very beautiful, and they have the reputation for a delicate wit and decided artistic tastes.

Nearly all the chief families of Sucre have paid several visits to Europe. Sucre, with Cochabamba and La Paz, contains most of the culture of Bolivia. It was formerly renowned all over America for its



PARTIAL VIEW OF SUCRE.

To face p. 198.

ancient university. It still possesses the faculties of law, medicine, and theology ; and the secondary education now gratuitous in Bolivia is provided in three *lycées*.

III. There are in Sucre a few hotels of the second class, among them the Colon, on the Plaza 25 de Mayo, and the Hôtel 25 de Mayo on the same Plaza ; the price of pension there runs from 8s. upwards.

Here are some prices of a few articles of ordinary consumption :—

| | | | | | | |
|----------------------|-----|-----|-----|-----|---------------|---------|
| Beef | ... | ... | ... | ... | 5d. to 6d. | per lb. |
| Mutton | ... | ... | ... | ... | 4½d. to 5d. | " " |
| Pork | ... | ... | ... | ... | 4d. to 4½d. | " " |
| Bread | ... | ... | ... | ... | 5d. to 7½d. | " " |
| Butter | ... | ... | ... | ... | 7½d. to 10d. | " " |
| Cheese, good quality | ... | ... | ... | ... | 11½d. | " " |
| Wine of the country | ... | ... | ... | ... | 8d. per pint. | |
| Potatoes | ... | ... | ... | ... | ½d. to 1½d. | per lb. |
| Haricots | ... | ... | ... | ... | 1d. | " " |
| Maize flour | ... | ... | ... | ... | 1d. to 1½d. | " " |
| Wheat flour | ... | ... | ... | ... | 3d. to 3½d. | " " |

Wages paid to members of the chief corporations or trade unions are :—

| | | | | |
|---|-----|-----|--------------------|----------|
| Masons and stone-cutters | ... | ... | 3s. 2d. to 8s. | per day. |
| Carpenters and farriers | ... | ... | 2s. 5d. to 3s. 2d. | " " |
| Cabinet-makers, locksmiths, french polishers, machinists | ... | ... | 4s. 10d. to 8s. | " " |
| Artisan's labourers, tailors, hat-makers, joiners... | ... | ... | 1s. 7d. to 3s. 2d. | " " |
| Coachmen and carters | ... | ... | 2s. 6d. to 3s. 2d. | " " |
| Labourers, casual and regular | ... | ... | 1s. 5d. to 1s. 8d. | " " |

Endemic affections are unknown in Sucre, and epidemics are very rare. The average annual temperature is 56·3°. The climate, being extremely dry, is very agreeable and healthy ; indeed, one may without exaggeration say that Sucre enjoys perpetual spring. The atmosphere is generally clear, and only during the rainy season is there much atmospheric elec-

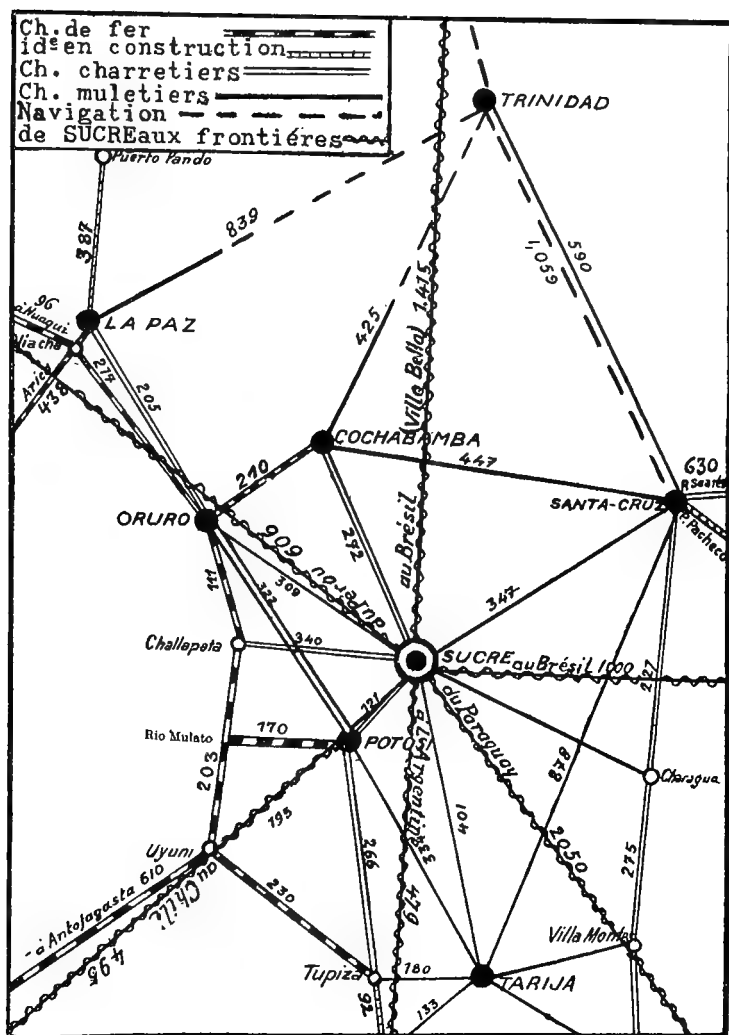
tricity ; then there are often violent thunderstorms. The city is protected by a large number of lightning-conductors, fixed at all prominent points.

After Sucre, the chief towns of the department are Camargo and Padilla.

IV. Despite the natural wealth of all the provinces of the department of Chuquisaca, despite incontestable progress and conspicuous prosperity, its immense productive capacity has never yet been adequately exploited, owing to the lack of an easy outlet and means of transportation. The department is sufficient unto itself, the lack of communications leaving it to some extent isolated in the midst of Bolivia. This isolation will happily soon be terminated by the construction of the railway from Potosi to Sucre, which is now being built. Thanks to the many resources of the department, this railway is certain of ample traffic and of a revenue which will soon repay the cost of the line.

The commercial movement which this line will provoke in Sucre and the surrounding country will also involve the provinces of Chayantes and Campero, in the department of the Cochabamba, which are near the capital. While agriculture, hitherto unduly neglected, is certain to yield great profits, the mining industry is not likely to lag behind, for veins of silver, copper, tin, and petroleum have been reported in the neighbourhood of Sucre. According to tradition, gold is abundant in the surrounding mountains.

With communications as they are at present, access to Sucre is relatively easy during the dry season, but during the rainy season it is extremely difficult, for all the roads are in bad condition ; at this season it is possible to travel only on mule-back. Leaving La Paz for Sucre, the 318 miles (in a straight line—really the distance is 406 miles) which divide the two cities are covered as follows : the traveller takes the railway from La Paz to Challapata, the fourth station



after Oruro ; at Challapata he takes the diligence, which takes four and a half to five days to cover 210 miles. The fare is £4 16s. to £3 12s., according to the vehicle, and about 24 lb. of luggage can be taken free, the excess being charged for at the rate of 9s. 7d. per 46 kilos or 101 lb. On mule-back the journey takes eight to ten days, and the cost is variable.

The departmental capitals nearest Sucre are Potosi and Cochabamba, which are respectively 75 and 168 miles distant. The departments of Sucre and Potosi are separated by the Rio Pilcomayo ; the two banks are joined by the Sucre bridge, an original structure consisting of two abutments in the form of a portico, and a plank roadway suspended by cables which are stretched when the bridge is to be used. Travelling to Sucre directly from the coast, the traveller leaves the Antofagasta railway at the Rio Mulato station, in order to take the branch line of 108 miles to Potosi, which was opened in 1912. From Potosi to Sucre there are only 75 miles to be covered by means of the diligence.

V. The department of Potosi is famous for its fabulously rich mines and its high physical altitude. It lies between the Argentine Republic, the Chilian province of Tarapaca, and the departments of Oruro and Cochabamba. Its area is 57,354 square miles, its maximum altitude 20,463 feet, its minimum 6,314 feet. The surface is extremely rugged and unequal, the climate healthy but very severe, and changes of temperature are excessive and of daily occurrence. Despite the great mineral wealth of this department its population is by no means dense, being at the present time only some 320,000. With such a climate vegetation is rare and agriculture difficult ; little is grown save barley, a little maize, potatoes, and a few roots, and these only in protected positions.

The sparse vegetation of this elevated region serves

as fuel, together with *taquia*, or the dried droppings of the llama. This vegetation consists chiefly of *tola*, a small woody shrub of apple-green colour, which is found all through the Cordillera above a certain height, and as high as 14,800 feet. It is accompanied by *quenua*, another mountain shrub, of sickly appearance, which at a distance resembles the olive in form and colour. The wood is twisted but tough, and forms an excellent fuel, being comparable to charcoal in respect of the little ash left and the extreme heat produced.

Above 23,000 or 24,000 feet one begins to find a curious and interesting vegetable, the *yareta*. It has the look of a huge green mushroom without a stem. Beginning like a green spot on the ground, it grows on the stoniest soil and even on the rock ; this green spot spreads, and grows in thickness as it spreads, so that it gradually assumes a convex form ; it is composed of a multitude of hollow woody filaments, forming a sort of honeycomb structure. On the first series of these tiny hollow stems yet others grow, until the whole mass of this strange vegetable resembles a colossal mushroom, often as much as six feet in diameter.

This curious plant is highly resinous, and is always covered with tears of gum. It has extremely small flowers, which hardly adhere to the green surface. The *yareta* is an excellent fuel ; it burns like peat, with little flame, gives a fair amount of heat, but produces a great deal of ash. The development of this plant must be extremely slow. We have seen patches of *yareta* on which plants of *tola* had grown as though from the soil, and sometimes tufts of a tall harsh grass not unlike alfalfa.

Although the vegetable kingdom is poor in the department of Potosi, it is not so with the mineral kingdom. Silver, gold, copper, bismuth, tin, marbles of different colours, sulphur, etc., abound. There are

also many thermal springs, principally in the province of Frias.

VI. The department consists of ten provinces : Frias, of which the capital is Potosi, 290 miles from La Paz ; Charcas, divided into three sections, whose capitals are San Pedro, situated at an altitude of 12,387 feet and 207 miles from Potosi ; Sacata, and Chayanta. The province of Chayanta has for its capital Colquechaca, 13,844 feet above sea-level and 121 miles from Potosi ; the capital of Porco is Uyuni, 13,000 feet above sea-level and 124 miles from Potosi ; this last province contains the populous mining centres of Pulucayo and Huanchaca. Other provinces are Linares, capital Puna, about 30 miles from Potosi ; and Bustillo, capital Uncia.

Then come the provinces of Nor-Chichas, divided into two sections, the capital of the first being Cotagaita, 111 miles from Potosi and 8,705 feet above the sea, and that of the second Vitichi ; Sur-Chichas, capital Tupiza, 164 miles from Poyosi, at an altitude of 9,855 feet ; Nor-Lipez and Sur-Lipez, capitals San Cristoval and San Pablo, 2,111 and 262 miles from Potosi respectively, and 15,744 and 14,461 feet above sea-level. The former of these two towns is one of the highest centres of population on the face of the globe.

We need not describe these provinces ; they are all situated in a mountainous country, much broken up and consisting partly of high table-lands ; they share much the same vegetable products and the same minerals—silver, tin, and gold. The six first are watered by the Pilcomayo and its affluents, and many other rivers, such as the Coguyo, Marcoma, Chayanta, Cotagaita, Tumusla, Lipez, San Pablo, etc.

VII. Potosi is a name that was heard all over the world long before that of Bolivia was known ; it was the country of proverbial wealth. Its capital, the largest city of the department, owes its existence and

its fame to the Cerro de Potosi, situated not far from the city, which, between its discovery in 1545 and the year 1850, furnished an enormous quantity of silver, which has been estimated at something like 20,000 tons.

Potosi is built at a height of 13,388 feet, on the southern slope of a mountain whose northern slope is almost horizontal. It enjoys the advantage, which will become more obvious in the future, of proximity to one of the branches of the Pilcomayo. Potosi is one of the few cities in Bolivia which possess the archives of their foundation and their growth. Founded in 1546, shortly after the discovery of veins of native silver made by the Indian Gualca, a llama-herd, on the neighbouring mountain, its growth was so rapid that two months later no less than 2,500 houses sheltered 14,000 Indians and whites. A first census, taken in 1573, gave a population of 120,000, that of 1611 gave 114,000, and that of 1650 160,000. To-day it is only the shadow of what it was in the eighteenth century; after having fallen to 8,000 inhabitants in 1825, Potosi now numbers 25,000 to 26,000.

Cities like Potosi, built on plateaux on which trees can hardly grow, are anything but gay in their aspect, and would seem to offer but little to the visitor; but really they are quite supportable, above all when there is a hope of wealth. Owing to the nature of the site most of the streets of Potosi are very steep and rather narrow, and in general crooked, not to say tortuous.

The houses are of one story only, except in the centre of the city, where a story is added; there is a very fine plaza, the Plaza Pichincha, together with the chief commercial houses and the dwellings of wealthy proprietors. Everywhere in this city, especially in the outlying quarters, one meets with unmerited decay; many public buildings, above all



POTOSÍ—PLAZA LIBERTAD.



TUPIZA—PLAZA AND CATHEDRAL.

churches, together with dwelling-houses, and factories in ruins, are met with on every hand.

One of the most important buildings of Potosi is the Casa Nacional de Moneda, or Mint, built in 1562 with wood dragged overland from the forests of Oran in the north of Argentina. It cost over a million piastres, and still possesses an equipment which is excellent in spite of its antiquity. The Matriz church or cathedral is superb, indeed one of the finest in the Republic ; one may also cite San Lorenzo, San Francisco, and Santo Domingo ; then the Pichincha College, the Government Palace, and the Casa de Justicia. In the days of its glory Potosi boasted of sixty churches.

There is a good library in the city, a Museum of Mineralogy, a theatre, a hospital—San Juan de Dios, in charge of the sisters of Santa Ana—and several printing-houses, from which various journals and reviews are published. A school of typography for young girls, which was established in 1912, was an instant success. Among the few hotels of Potosi the least bad are the Continental and the Colon.

On the heights overlooking the city there are thirty-two reservoirs, artificial lakes, constructed in 1621 at a cost of three million piastres, all provided with sluices and distributing conduits. Of these only twenty-two are in good condition to-day. These reservoirs are fed by the rains and melting snows ; they supply the public and private fountains of Potosi, and the water used in the factories of the Rivera, among which is the Real Socavon, one of the best in Bolivia.

VIII. The climate of Potosi is cold ; what is most disagreeable is the variability of the temperature (one often gets the four seasons of the year in a single day), and the rarefaction of the air and consequent lack of oxygen, which makes it impossible to walk rapidly without suffering a sensation of suffo-

cation. The average temperature is 48.2° in the shade ; the maximum rarely exceeds 59° ; the minimum is 9° below zero.

Despite the great altitude and the cold climate, vegetation is not entirely absent during the summer (in the winter there is absolutely none). Roots and a few plants and flowers are grown in the city ; the flowers, it is true, need a great deal of care and must be sheltered during the winter ; the vegetables are excellent, but corn will not ripen, for lack of heat. The environs of Potosi are not to-day so barren and desolate as they used to be ; potatoes and barley and beans are grown, and to an increasing extent, much to the surprise of the traveller who visits Potosi in the summer.

Living is very dear in Potosi, above all for those who will not content themselves with the food that the people of the country consume. Wines especially are very dear. This is due to the fact that the city produces next to nothing, while the cost of transport on the backs of asses, mules, and llamas, the only means available down to the year 1912, is very heavy, hence a considerable increase in the price of goods.¹

The business life of the city is fairly active. The chief industry of Potosi will probably always be mining. To gain an idea of the activity which used to prevail it is enough to pass in review the number of factories, foundries mostly, in the outskirts of the city, nearly all of which are to-day in ruins or abandoned. However, there are still twenty-eight

¹ Prices of various articles :—Beef, 11d. per lb. ; mutton, 6½d. to 7½d. per lb. ; butter, 2s. 2d. to 3s. 6d. per lb. ; a bottle of wine of the country, 3s. 2½d. ; Chilian *vin ordinaire*, 4s. 10d. ; a bottle of beer, 2s. 4d. ; potatoes, 8s. per 101 lb. ; American or Chilian flour, 29s. per 101 lb. ; sugar, 41s. 6d. per 101 lb. ; charcoal, 6s. 5d. per 101 lb. ; *chuno* (a sort of potato meal), 38s. 6d. per 101 lb. ; maize, 19s. per 101 lb. ; cabbages, 4s. 10d. per small basket ; marrows, 3s. 2d. ; tomatoes, 7s. per basket, etc.

well-organized smelting-houses or other works, treating the ores of silver and tin by smelting or concentration. Besides these large works there are many tin-washing enterprises, which stretch a distance of more than seven miles along the Rivera. There are also foundries and engineering shops in the city, which turn out good work.

IX. For centuries the metals exported from Potosi have been mined from the Cerro de Potosi. This mountain rises to the south of the city, 15,688 feet above the level of the sea and 5,044 above the surrounding plain. It is a basaltic hill having the form of a sugar-loaf, measuring some 7,000 yards across at its base, while the circular summit, crowned with porphyry, is only 10 yards in diameter. Its ancient wealth was due, as its modern wealth for that matter, to the mines of silver discovered in 1545, of which a few only, the richest, gave the King of Spain, in 107 years, the fabulous sum of 3,240 millions of piastres in virtue of his royalty of one-fifth levied on the mines of Bolivia. It is difficult to obtain even approximate figures of the yield of this famous mountain from its discovery to our own days, although a great portion was delivered to the mint of Potosi. Approximate calculations made by Señors Aramayo, Ballivian, and Roxas put it at over 6,000 cubic yards of bar silver. If a column of silver were built whose section should be 1 foot square, this amount would raise it to a height of more than 16,000 feet.

But the Cerro is not all ; the vast belt of country to the east, dominated by the steep black peaks of the colossal mountain known as Kari-Kari, contains enormous quantities of silver and tin ; all those mountains, which from Potosi form a magnificent panorama, the snowy summits of the Cordillera de los Frailes to the south-west, the mountains of the Porco range to the south-east, etc., contain the ores

of tin and silver in many forms and combinations : galenas, blendes, pyrites, sulphides, and chlorides of silver. More than twenty million pounds could well be invested in mining this region only, and it would earn ample profits and exhaust only a tithe of the wealth that lies buried there.

We shall see in another chapter what may be expected of the scientific exploitation of the mines of Potosi now that the railway is reaching them ; wealth that has hitherto remained unexploited, or has been exploited only in a primitive fashion, owing to the lack of proper equipment and transport.

X. The department of Potosi is, after that of La Paz, that which contains the largest number of populous centres, which are at the same time rich mining centres. There are the towns of Uyuni, 6,000 inhabitants ; Cotagaita and Colquechaca, the latter alone contains a population of 8,000 miners ; and finally Tupiza, less than 60 miles from the Argentine frontier. This pretty little city, which has 5,000 inhabitants, of whom 150 are foreigners, is destined to undergo a great development with the arrival of the railway from Uyuni, which will run onward to La Quiaca. Foreigners, particularly Argentines, will quickly be attracted by the riches of the province of Sur-Chicas, of which Tupiza is the capital.

The little city occupies a pretty valley, some three-quarters of a mile wide, entirely cultivated and planted with trees. The effect is charming. The houses are built along one side of the river which gives its name to the city, and all are surrounded with beautiful gardens. The principal square is itself a well-kept garden ; one of its sides is closed by the Municipality and the Government offices, the latter being housed in a handsome building ; there is also on this side a modern church, which shows its high towers above the trees.

The climate of Tupiza is delightful, being always

temperate save in the months of July and August, at which season the icy south winds are blowing.

XI. The department of Oruro lies on the high table-land of that name. It is the smallest department of Bolivia, 19,071 square miles (or some say 27,000); its altitude varies from 21,556 to 13,667 feet; it is definitely a cold country. This department is almost as notable as Potosi for its mineral wealth; above all for its silver mines, known since the days of the Spaniards, whose works are still to be seen on the flanks of the hills which surround a portion of the city of Oruro. The ores of silver are found more particularly in veins, encrusted in a white porphyry mingled with quartz; those most commonly found being the *cournonita* and the *panabasa*, sulphides which are locally known as *negrillos*.

But silver is not the only metal found here; to-day most of the mines in working order are at once silver and tin mines, the tin being at present the most remunerative metal. Gold is found also, copper, bismuth, and antimony, as well as the kaolin or china clay used in the manufacture of porcelain, but here used particularly to renovate the walls of adobe houses. The mines, then, form the principal industry of the department, their products being exported by way of Antofagasta. The other articles of export are chinchilla skins, the wools of the sheep, the llama, and the alpaca, all of which animals are bred here on a large scale, especially in the province of Carangas.

The department contains only four provinces: Cercado, capital Oruro. The surface is mountainous to the east, and the climate cold; the special products are tin, silver, gold, bismuth, and wools. The province is watered by the Desaguadero and a few other streams.

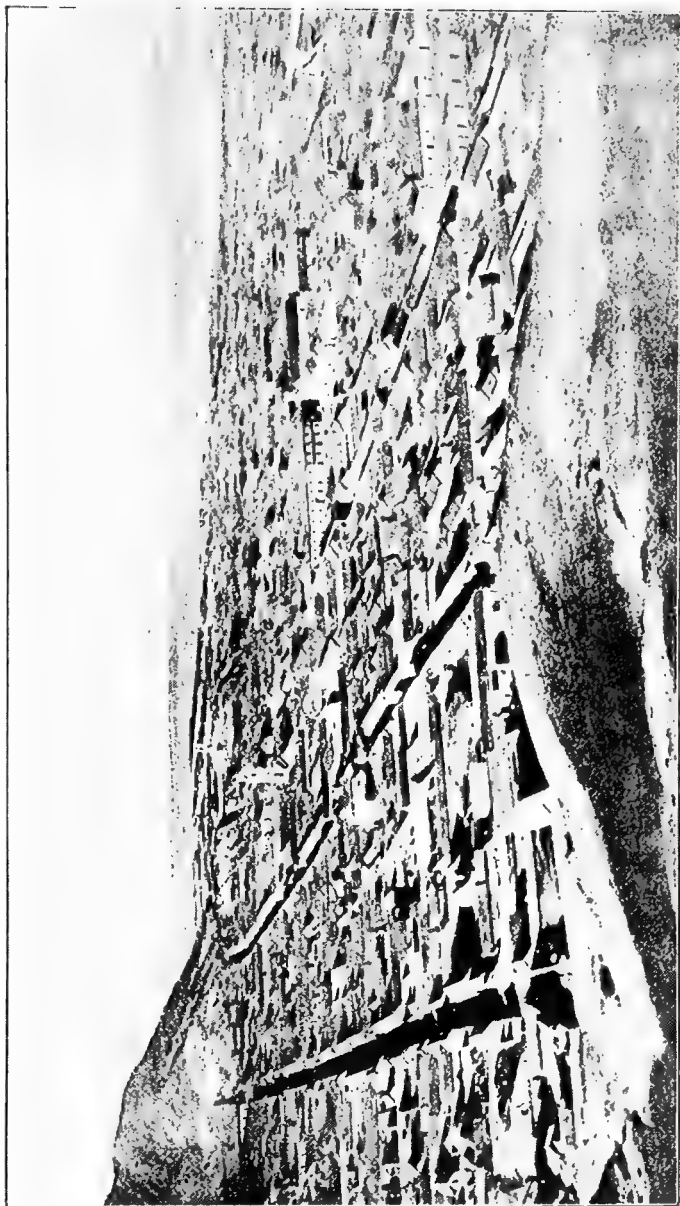
Carangas has for its capital the town of Corque,

built at an altitude of 12,218 feet. This province consists of wide plains ; but the surface is uneven and mountainous in the west, which portion skirts the Chilian frontier. Its peculiar products are the alpaca, the chinchilla, borax, and sulphur. It is watered by the Rios Lauca, Turco, and Barras, which latter flows into Lake Coipasa, and the Cosque, which flows into Lake Poopo.

Poopo, of which the capital is the town of Poopo, lying 175 miles from La Paz and 45 from Oruro, at an altitude of 12,162 feet, presents a mountainous surface in the east and is flat in the middle and the west. The climate is cold ; the special products are silver, bismuth, and wools. There are thermal waters at Urmiri. This province is watered by the Rios Poopo, Panza, Tacagua, etc., and contains Lake Poopo.

The province of Abaroa has for its capital the city of Challapata, lying 86 miles from Ururo and 213 from La Paz, at an altitude of 12,162 feet. Surface flat in the west and centre, mountainous in the east ; climate cold. Products, silver and tin ; thermal waters are found at Cahuayo and Sevaruyo. Principal river, the Pilcomaya, formed by the junction of the Collpani and the Cahuayo.

XII. Oruro, a departmental capital, owes its foundation, in 1595, to the mines discovered in the neighbourhood ; its prosperity was then almost as rapid as that of Potosi, the wealthy miners of the two cities rivalling one another in opulence and in multiplicity of festivals. According to a census taken in 1678, Oruro had then a population of 37,960 inhabitants, without counting the aborigines, and these, according to Dalence, numbered 75,920. The census of 1900 gave Oruro 15,398 inhabitants. At present the ever-increasing population is given as 26,000, including the population of the neighbouring mining centres.



ORURO.

The average annual temperature is 50°. The winds which prevail during July, August, and September are bitter and so violent as sometimes to amount to veritable hurricanes.

The city is only of mediocre interest ; it lies 127 miles from La Paz, at a height of 12,122 feet, on a plain which slopes almost imperceptibly to the east and more perceptibly to the west. The general aspect of the city is dismal enough, on account of the aridity of the surrounding soil, which is entirely devoid of vegetation. Leaving the railway-station, one enters a town of straight but narrow and rather ill-kept streets, served by a line of trams drawn by mules. Most of these streets are paved with pebbles and large stones, sloping steeply towards the centre of the road, so as to make a sort of gutter there for the quicker escape of the torrential rains. This is known as the *arroyo* (or brook), whence, no doubt, the phrase "to throw any one into the middle of the brook," when one means that some drunken person has been thrown into the street. In Oruro, especially in the less central parts of the city, everything goes into the "brook"—rubbish, dirty water, etc., and is left for the rain to sweep away.

These streets are lined with houses consisting of a single floor, except in the central part of the city. They are painted in all sorts of bright colours—blue, pink, white, and light grey especially—over the layer of kaolin which covers the adobe walls. The outlying streets are paved with the natural soil of the place, which is a sand of extreme fineness, raised by every wind that blows, and some wind is usually blowing. The modest appearance of many of the houses is due to the fact that most of them are the homes of cholos or Indians.

The Plaza 10 de Febrero is the centre and the chief meeting-place of the city. Wide and spacious—it covers nearly three acres—it is full of trees and

leafy shrubs, which are a pleasure to see in such a place, together with fountains and kiosks. In the centre is the statue of a former President of the Republic, Aniceto Arce, who promoted the construction of railways. On one side of the square, occupying it entirely, is the Government Palace, the residence of the prefect ; a vast rose-pink building of two stories, with a double gallery running the whole width of the front.

Oruro possesses a post-office, which is the finest in Bolivia, and a model barracks. There is not much more to mention, save the old church of San Francisco, the theatre, which is small but sufficient for the town, the School of Mines, and the market, in the heart of the city—a municipal structure, consisting of a sort of courtyard, intelligently arranged and very well provided ; in the middle stroll hundreds of chola and Indian women, clothed in their superimposed petticoats of vivid blues, reds, and yellows, and shawls of other colours, if possible, even more showy. The chief business street of Oruro is that known as El Comercio ; it is also the gayest, being lined with picturesque shops.

XIII. Oruro, the home of industrial and commercial progress, was the second city of Bolivia to install electric light and the first to lay a tramway. It contains nine banks and two agencies and four hotels, supposed to be of the first class, but barely passable ; all things are comparative on the high Bolivian plateau.¹ There are several factories and small industrial establishments, among them a large boot factory, founded in 1911 by a French Basque, which can hardly keep up with the demand. Four journals are published : *La Prensa*, *El Industrial*, *La Nación*, and another. The city spends annually a minimum

¹ Hôtel Francia, Hôtel del Comercio, Hôtel Terminus, Hôtel Bolivia. Price per day, *en pension*, 9s. 7d. and upwards.

of £640,000, which goes to Europe or Chile. Its mineral exports amount to more than £800,000.

Walking through the streets one perceives a great activity ; one feels the stir of important business affairs ; one seems to hear the chink of all the tin and silver which 10,000 miners are extracting or have extracted from the 5,000 mines or galleries which have been worked in Oruro. In trade and the mining industry the foreigners, who number about 5,500, Americans of all nationalities or Europeans, represent at least 50 per cent. of the whole. The Chilians, who number 200 in Oruro, own nearly two-thirds of the mines, and a capital of more than £800,000, employed in the exploitation of mining enterprises, such as the Llallagua, El Socavon, Huanuni, Morocala, San José, and other mines.

At a few paces only from the crowded streets yawn the shafts of a score of mines of enormous wealth. One of these is the Socavon de la Virgen, which belongs to the famous Oruro Company. It lies at the end of a street and runs into a great hill, whose bowels are simply a mass of tin and silver ores. A few paces farther on are the San José and Iltos mines, to say nothing of others, which for years have poured millions into the pockets of Bolivia—and their shareholders.

Food in Oruro is perhaps dearer than in La Paz, for the neighbouring country produces but little.¹

The price of fuel is an important question in this city, where the winters are bitter and the variations of temperature are frequent. At Oruro the price of coal is in general 16s. to 19s. per metric quintal of 220 lb. In its place the fuels usually burned are those we have already mentioned : taquia, costing

¹ Meat costs 11d. per lb. ; a fowl costs 3s. 7d. ; a dozen eggs, 3s. 2d. ; a litre of milk, 1s. 7d. ; a litre of petroleum, 1s. 0½d. ; a bottle of beer, 1s. 2½d. to 1s. 7d. ; potatoes, 28s. per 240 lb. ; flour, 19s. per 120 lb. ; maize flour, 21s. per 330 lb., etc.

8d. to 10d. the Spanish quintal of 101 lb. ; yareta, the resinous growth already described, costing from $5\frac{3}{4}$ d. to $9\frac{1}{2}$ d. per quintal ; and tola, a sort of coarse broom, costing $5\frac{3}{4}$ d. to $8\frac{1}{2}$ d. per half-quintal.

Here are the wages paid to various workers : foreign masons, Chilian or Argentine, 4s. 1d. ; carpenters, ditto, 3s. 2d. to 3s. 7d. ; labourers, 1s. 7d. ; cooks and domestics, 7s. 7d. to 12s. 10d. per month ; native masons, 1s. 7d. to 1s. 11d. per day ; native carpenters, 2s. 5d. Trade organizations are almost unknown in Bolivia, the needs of the native population are small, and wages are kept down by the Indians ; so that European artisans will not really be required until the country has undergone a much greater development, and until the cities are rebuilt and modernized. We except, of course, such as are employed in the mines or specially engaged.

Besides Oruro the department has only one other city : Challapata, 69 miles from the capital, on the Antofagasta-Oruro railway. The other provincial capitals are only large villages.

CHAPTER XIII

DEPARTMENTS OF COCHABAMBA, EL BENI, SANTA CRUZ AND TARIJA

- I. The granary of Bolivia.—II. The twelve provinces of Cochabamba.—III. The city of Cochabamba ; its aspect, life, trade, and industry.—IV. The future of Cochabamba. Means of transport.—V. El Beni.—VI. Its four provinces.—VII. The capital, Trinidad ; how connected with La Paz.—VIII. Riberalta and Villa Bella.—IX. A vast and wealthy department : Santa Cruz. Its products.—X. Its six provinces.—XI. The city of Santa Cruz. Aspect, life, and trade.—XII. Other towns. Means of transport.—XIII. Puerto Suarez.—XIV. The department of Tarija. Its provinces.—XV. The province or Territory of Las Colonias del Gran Chaco. Yacuiba.—XVI. The city of Tarija ; access and outlets.

I. THE department of Cochabamba is in all respects one of the richest and one of the most interesting in all Bolivia ; with it we enter into a region half temperate and half semi-tropical, ranging from an altitude of 16,777 feet down to one of 973 feet. Few countries display a greater wealth of vegetation, a more abundant fertility, a more beautiful and generous climate, and a landscape more full of life and variety.

Its area is about 23,200 square miles, or, according to some authorities, 33,540 ; its population is 380,000. Cochabamba belongs to what is known as the Amazonic region, whose area is estimated at 342,250 square miles ; the departments of Santa Cruz and El Beni and a portion of those of La

Paz and Chuquisaca belonging to the same region. Thanks to its many streams, the department of Cochabamba enjoys the greatest fertility ; it consists in great part of immense plains and magnificent valleys, open to the south and starting from the Royal Cordillera. These valleys are populated by innumerable herds of animals of all species. The vegetable products are many ; those which prosper most are maize, barley, wheat, coffee, rice, sugar-cane, coca, oranges, lemons, pomegranates, bananas, etc.

The forests are rich in timber of all kinds ; some suitable for building, others for cabinet-making ; dye-woods also are found, and rubber is abundant. Cochabamba is equally rich in respect of the mineral kingdom, containing gold, silver, tin, petroleum, and sulphur ; but owing to a lack of practicable means of transport all these vegetable and mineral resources have not yet been exploited as they deserve. The mining industry, unable in the past to attain any appreciable development owing to the difficulty of getting the necessary machinery into position, is now at last beginning to evolve, in view of the approaching completion of the Oruro-Cochabamba Railway, which will very soon transform the department and the neighbouring provinces into mines of wealth, and will more than ever confirm the title which travellers have bestowed on the department of Cochabamba : the granary of Bolivia.

II. The department contains twelve provinces :

Cercado, capital Cochabamba. Surface, mostly plains, but hilly towards the north. Climate, temperate and dry. Special products, vines, cereals, and fruits. Watered by the Rios El Rocha, Tamborada, and a few lagoons.

Quillacolo : capital of the same name, 68 miles from Cochabamba. Surface flat, but uneven toward the west ; climate temperate ; special

products, fruits and vines. Thermal waters are found at Putina.

Chaparé, capital Sacaba, 68 miles from the capital of the department. This province is mountainous in the south and flat in the north. Climate varied ; very damp in the north. Products, rubber, coca, timber, coal. Chaparé is traversed by the Rios Chaparé, Securé, Isiboro, Sinuta, etc.

Tarata (capital of the same name), 24 miles from Cochabamba, has a flat surface except in the north. Climate temperate. Products, cereals and fruits. Watered by the Rio Cliza. In 1912 a new province, that of Cliza, was created, including what was formerly a portion of Tariza. Its capital is Cliza.

Punata is a province divided into three sections. The chief city of the first section is Punata, 35 miles from the capital. It is flat in the south and mountainous in the north. The climate is varied ; products, fruits, cereals, and timber. Rivers, Ibiriso, San Mateo, Punata.

Tapacari, capital Tapacari, 55 miles from Cochabamba. Surface uneven ; climate varied, but dry. Cereals, vines, marbles. Thermal waters at Leque. Rivers, Tapacari and Calliri.

Arque, whose capital, of the same name, is 41 miles from Cochabamba, and Capinota, capital Capinota, 31 miles from the capital of the department, are two provinces which resemble the last in matters of surface, climate, and products. They also contain silver, tin, and marbles. Thermal waters are found at Cayacayani. Traversed by the Rio El Caine, formed by the junction of the Tapacari and the Arque.

Ayopaya is a province celebrated for the gold mines of Choquecamata. The capital is Villa Independencia (the ancient Pulca), which lies 65 miles from Cochabamba ; the surface is mountainous

and the climate varied. Cattle, sheep, and vicunas are among the products ; others are gold and precious stones (found in the *puna* and the tropical valleys and other portions). Rivers, the Cochabamba and its affluents, the Santa Elena, Cotacajes, etc.

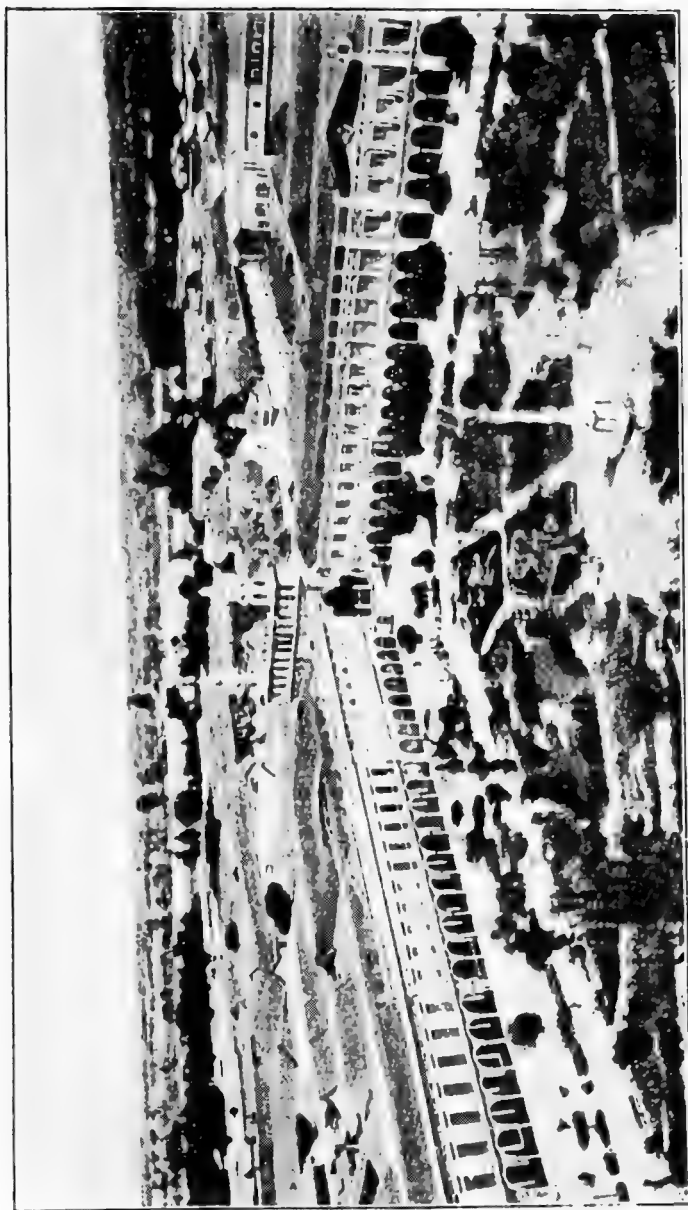
Totora is divided into three sections ; the first has for its capital Totora, 89 miles from Cochabamba ; the two others are Pojo and Pocoma. The surface is mountainous, with a few plains ; the climate varied. Special products, cereals and coca ; there are also great forests. Traversed by the Rios Mamoré, Chimoré, Ichilo in the north ; the Totora and the Julpe in the south.

Mizque, whose capital is Mizque, lying 107 miles from the departmental capital, is a country of mountains and valleys ; it enjoys a dry but varied climate. Horses, cereals, peppers, tobacco, hardwoods, silver. Rivers, the Mizque, Caine, Tintin, and Uyuchuma.

Campero, capital Aiquile, 145 miles from Cochabamba ; products, almost the same as those of the last province ; sugar-cane also is grown.

III. The city of Cochabamba is the second in the Republic in point of importance. Its population, which exceeds 30,000, will have doubled before many years are out. It lies at a distance of 274 miles from La Paz, 168 from Sucre, 129 from Oruro, at an altitude of 8,435 feet above sea-level. It was founded in 1573, being then called Oropeza, on a plain that was formerly a lake, as is indicated by the Quechua name given to the city, which means Plain of the Lake.

The average annual temperature of Cochabamba is 66·32° in the shade ; a mild temperature, despite the situation of the city in the torrid zone, thanks to the elevation of its site and the neighbourhood of the Cordillera, whose snow-covered summits are always visible. The rigours of winter and summer



COCHABAMBA—THE PLAZA.

are hardly felt. The rains are abundant from November to April.

Built on a level site, the city is fairly regular in plan ; the streets are straight and over 26 feet wide. The most picturesque and animated is the Comercio. Cochabamba contains a fair number of fine buildings, both public and private.

Among these we must mention the Government Palace, the Law Courts, and the Municipal Palace, which, with the cathedral, is situated on the Plaza 14 de Setiembre, in the centre of the city. Near this plaza, which commemorates the date on which the patriots of Cochabamba took up arms in 1809 in the War of Independence, are the banks and other public buildings. We must also mention the Acha theatre ; of the churches San Sebastian is one of the most frequented. The women of Cochabamba, who have throughout Bolivia the reputation of being ardent patriots and accomplished mothers of families, are also reputed, as far as the higher social strata are concerned, to be extremely pious.

Social life in Cochabamba is brisk and lively ; on account of the mildness of the climate much of it is passed out of doors ; and the public promenades are much frequented. These are not very numerous ; there are only six plazas in the city ; to these we must add the Alameda and the Hill of San Sebastian. These two promenades are, with the Plaza Colon, the favourites, after the fine alleys and galleries which surround the Plaza 14 de Setiembre.

The society of Cochabamba is cultivated and peculiar for a profound sense of solidarity. Of all cities of Bolivia it contains the smallest proportion of illiterates ; it is true, however, that 60 per cent. of the total population is of white race. There are barely 400 foreigners, of whom about 150 are Germans ; their colony is the most numerous, except, perhaps, for that of the Peruvians.

The University of Cochabamba is well attended. At the end of 1912 the National College possessed 465 students, the American Institute 225, and the School of Law 73. There is also in the city a faculty of medicine, another of theology, and a college of agriculture.

Cochabamba boasts one of the best clubs in Bolivia after that of Oruro : the Social Club, of which all the elect are members ; there are several passable hotels (of course one must not be too exacting), such as the Gran Hôtel Continental, the Hôtel Central, and the Hôtel de Comercio, whose tariffs run from 8s. upwards.

Life in Cochabamba is cheaper than elsewhere in Bolivia, excepting always imported goods, the prices of which are very much those we have already quoted.

Beyond a few well-equipped breweries, Cochabamba has no characteristic industries. There are a few small factories making linen and cotton thread, a few tanneries and potteries, and manufactories of tinned meats, candles, and soaps. For the most part the economic life of the city and department is supported by agriculture. The import trade is extremely active in the city ; there are fifty import houses, operating with large capitals ; the German element prevails, inundating the surrounding country with articles which are bad or indifferent, but certainly cheap. Displaying an admirable initiative, the Germans establish themselves in rural centres which to-day number only a few hundred inhabitants, but which are destined to undergo a rapid development, because situated on one of the great commercial routes ; these nascent cities will be profoundly transformed by the completion of the railway programme now in process of execution.

The trade of Cochabamba with its provinces and the departments of El Beni and Santa Cruz is extremely active, and represents about £144,000 yearly.

This trade consists principally of the exchange of agricultural or natural produce, but also, to a small extent, of manufactured articles. The crops produced by the plains and valleys of Cochabamba provide the neighbouring departments with cereals ; this is especially true of El Beni, which exports in return a portion of its yield of rubber, hides, and other articles.

The country-side round about the city is, although damp, extraordinarily fertile, partly on account of the climate, partly by reason of the peculiar quality of the waters which irrigate it ; these being rich in a variety of fertilizing substances proceeding from the decomposition of the rocks and earths of the Cordillera.

IV. The city and department of Cochabamba are destined to great future prosperity, and their development will be rapid ; the coming transformation will be the work of the Oruro-Cochabamba railway, which is at present being constructed. This line traverses the finest provinces of Bolivia, so that in the near future the agricultural and mineral wealth of this part of the Republic will be open to advantageous exploitation.

Already an electric railway serves the rich and fertile belt of country which runs from Vinto to Arani, passing by the capital. This line is to be prolonged as far as Totora, 108 miles from the capital. In another direction measures have been taken for the construction of a promenade or boulevard, 65 feet in width, running the eight miles between Cochabamba and Quillacollo. The population and the wealth of these two cities are constantly increasing, so that their union in a single city will be only a question of time once the boulevard has been built. The city of Quillacollo is renowned for its healthy climate, as well as for the beauty of its site, in a country which is one of the most beautiful and fertile portions of Bolivia,

and which will be served by the Oruro-Cochabamba Railway.

After the capital the principal centres of population in this department are the cities of Mizque, Punata, Sacaba, and Quillacollo ; which are not, as we have seen, of any great significance in respect of their population.

Until latterly the journey from Oruro to Cochabamba, 108 miles by road, had to be made by diligence, but was interrupted during the rainy season, when the roads are flooded for long distances. Even now a portion of the journey has to be made thus, but this will be so only for a few months longer. The whole journey took two days or two and a half, and cost 48s. During the rainy season the distance had to be covered on muleback, and occupied five to six days. This means of travel cost about 19s., and the cost of a donkey for baggage was 5s. or 6s. more. By the time these words are printed in English the railway service should have been available for some months.

V. The department of El Beni, situated in the north-east of Bolivia, is divided from that of La Paz only by the Rio Beni, to which it owes its name. It is a region of vast plains, slightly broken by hills to the east and the south-west, varying in altitude from 2,817 feet to 465 feet above sea-level. Its area is considerable, amounting to no less than 101,814 square miles ; it is, however, with its 37,000 or 38,000 inhabitants, most of whom are Indians, the most sparsely inhabited department in Bolivia. The white inhabitants are the employees, commercial and industrial, who are occupied in the gathering of the rubber harvest, the great product of the department.

El Beni, indeed, is almost entirely covered with forests in which the famous hevea or rubber-tree is found. Such portions as are not wooded form

great natural prairies, which support enormous herds of cattle and flocks of sheep and other wool-bearing animals. Its river system is admirable, the numerous and abundant streams which cross it in all directions and flood large portions of it during the rain season make it a country especially favourable to vegetation. The vegetable wealth of the department is indeed extraordinary ; all the products of the tropical zone flourish there ; the only drawback resides in the certain inconveniences peculiar to tropical countries which are too thickly wooded ; it is not a particularly healthy country, and insects of all kinds are rife ; dangerous mammals are not found in any appreciable numbers.

Besides many interesting varieties of the palm, that tree whose fibres are so valuable and so generally employed, one finds in El Beni, besides a number of gums and resins, whose exploitation is not for the moment practicable, enormous quantities of the *Siphonia elastica*, or hevea, yielding various qualities of rubber. The collection of this product and its preparation, of which I shall speak again, have drawn to this region a foreign population which is destined rapidly to increase, despite the dangers of the climate.

The roads which are being made, although Nature and the elements rapidly ruin them ; the water-courses which are being improved, and the railways which will soon be built, will give a fresh impulse to the rubber trade. On account of Asiatic competition proper plantations ought to be laid down, if this resource is to be saved for the department now that exploitation is facilitated by the Madeira-Mamoré route. In 1911 the quantity of rubber collected in the department was 3,351,025 lb., worth £639,932. These figures are those of the custom-house at Villa-Bella.

The rubber industry is the only industry that is

really much developed in El Beni. A certain amount of stock-raising is practised ; but it might well be more general, and the same is true of the cultivation of tropical products in general ; such development would be greatly to the advantage of the population, which would find in these industries better conditions of livelihood ; a healthy and abundant diet with a modicum of hygiene being the best preservative against paludism.

VI. Despite its wide extent the department of El Beni is divided into four provinces only. Their characteristics are as follows :—

Mojos or Cercado, whose capital is Trinidad, which is also the departmental capital ; the authorities of the second section are installed at San Ignacio. The province is entirely flat, except for a few hills in the east ; the climate is hot. Stock-raising and tropical agriculture are the chief industries. Fish of all kinds abound in the rivers—so do alligators. The rivers crossing this province are the Mamoré, the Securé, the Sinuta, the Iviri, and the Tijamuchi.

Yacuma is divided into two sections, the capital of the first being Santa Ana, on the Rio Yacuma, and that of the second a town or village called Reyes. The soil and produce are the same as in the last province. Turtles abound in the Rio Beni, which crosses the province, together with the Mamoré and its affluents, the Yacuma, Apere, Iruyani, and Tijamuchi ; there is also Lake Rogagua and several smaller lakes.

The large and remote province of Itenez, which is divided from Brazil by the Rio Itenez or Guaporé, has its capital at Magdalena, which lies on the Itanama, an affluent of the latter river. The surface is flat, with a few hills in the east. The products are cattle and tropical fruits, etc. ; also, of course, rubber ; iron is abundant, and there is at least some gold. The chief rivers are the Mamoré, Itenez,

Machupo, Itonama, Baures, Paragua, and the Serre : the lakes are Itonama and Rey.

The economic life and development of the province of Vaca Diez are now more than ever directly influenced by the waterway of the Amazon and the Madeira-Mamoré railway. Vaca Diez borders upon Brazil ; it is divided into two sections ; Riberalta, on the Rio Beni, is the capital of the first, and Villa Bella, on the confluence of the Beni and the Mamoré, which together form the Madeira, is the capital of the second. All this region consists of flat, level tracts, which are flooded during the rains ; the climate is hot ; the special product is rubber. The chief rivers are the Beni, the Mamoré, and the Yata ; in the course of the latter there are rapids. There is a lake, Rogaguado by name.

VII. Trinidad, the capital of the department, lies 520 miles from La Paz, by road and river, and 393 miles by the Oruro-Cochabamba route (rail, road, and river). This city was founded in 1562, on the ruins of the prehistoric palace of the Gran Moxo. It has not had a prosperous history ; it is the least important of all the departmental capitals, for its population is barely 5,000. Its aspect is depressing and shabby ; there are many blocks of dwellings or *manzanas*, each 120 yards square ; but in most cases the blocks are only partially completed. The streets all end in the grassy plains which surround the town ; they are lined with houses which for the most part boast only of one floor. However, there are many stores and trading concerns, selling imported goods, but very few native products. The houses, which usually boast a veranda in front, are nearly all of wood ; solid and durable buildings are not easy to erect in a country exposed to periodic floods, especially as the timber employed is of indifferent quality and only lasts a few years where it comes into contact with the soil.

There is, however, a pretty church, built by the Jesuits, and at right angles to it, the two forming the two sides of the public plaza, is the prefecture. A school of arts and crafts (manual trades) was founded here in 1912.

Communication between Trinidad and La Paz is best effected by the Oruro-Cochabamba route, which enables the traveller to utilize the railway or the diligence for a distance of 273 miles. From Cochabamba to Trinidad the distance is 263 miles by the Chaparé route, which includes 100 miles by water ; the rest of the journey is made on mules, and is often extremely difficult on account of the rains. A second route is by way of Chimoré, a distance of 347 miles—213 by water and the rest in the saddle. There is finally a third route (we cite from memory), which passes through Santa Cruz ; it involves a journey of 643 miles by land ; if part of the journey be made by water the distance by water is 656 miles, and the total distance 1,022 miles. From Trinidad to Villa Bella by the Rio Mamoré is 445 miles.

VIII. After Trinidad the only centre bearing the title of city in El Beni is Magdalena, situated on the Rio Itonama. But places which are *villas* in nothing but title sometimes suddenly acquire a population almost equal, if not superior, to that of the cities we have mentioned, and a greater activity and movement of trade. Such were Riberalta and Villa Bella. The development of these two localities can only proceed at an increasing rate, and the same is true of their population, by reason of their situation on a navigable river which is or will be touched by the Madeira-Mamoré Railway or its continuation from Guayramerim to Riberalta (46 miles by land).

We have seen that Riberalta lies 920 miles from La Paz,¹ facing the outlets of the Madre de Dios

¹ By the route leading from La Paz to Rurenabaque and Puerto Pando by way of Sorata.

and the Beni. This little town has a very picturesque position, on a small plateau which stands some 65 feet above the confluence of the two great rivers, a situation which has facilitated the influx of a considerable population. The town is really a long string of uniform houses, whose wide, covered verandas occupy, or rather form, the sidewalk of the avenue on which they are built. A few other streets, laid out in straight lines, and ending in the belt of cleared forest, branch off from this main street, which is adorned with many shrubs.

In 1882 there were only two or three houses on this site. In 1885 the Parisian firm of Braillard Frères installed a representative here, to negotiate for rubber ; he it was who gave the town its name. In 1901 it had a population of 1,400 inhabitants ; now there are more than 3,500, and they are constantly increasing. There are in Riberalta a number of trading houses which, while they sell general merchandise and articles of food to the rubber stations, also export rubber in larger or smaller quantities. These firms own a certain number of small steamers for the river traffic.

Villa Bella also is built on a picturesque site, at the confluence of the Rios Beni and Mamoré, 125 miles lower down than Riberalta, and 1,010 miles from La Paz. The houses are like those of Riberalta—a single story with a veranda ; the walls are made of stakes of a kind of bamboo known as *chuchios* ; they are covered with a dressing of mortar, and in the houses of well-to-do persons the inner walls are papered or hung with suitable fabrics. The roofs are of palm-leaf or corrugated iron. The streets are wide, and end in either direction on the bank of one or the other of the two rivers which bound the city to the east and west. They do not end so soon toward the south ; there is a tract of freshly deforested land, which is rather damp as yet, but which

is divided into clearly marked squares, some of which are already gradually being lined with houses.

Facing Villa Bella, on the right bank of the Mamoré, the little Brazilian town of Villa Murtinho is visible.

The conditions of living in Villa Bella, apart from the damp heat of the climate and the danger of paludism, are by no means unfavourable ; there is an abundance of all the necessities of life, although prices are certainly rather high. The country is rich in almond-trees, there are two varieties of cocoa-palm, while vanilla and other valuable products are common.

All this province of Vaca Diez, of which Villa Bella is one of the capitals, and which still contains tracts which are unexplored, offers an enormous field of action in respect of the exploitation of rubber, whose export is rendered less difficult and costly by the completion of the railway, which was opened in September, 1913, and enables the local traffic to avoid the falls of the Madeira.

IX. Santa Cruz is the largest province of all Bolivia, and that richest in wild animals and wild vegetable produce. Its altitude varies from 9,754 feet to a minimum of 377 feet ; its area is 140,960 square miles ; and it is inhabited by a population of 236,000, of various races and many different degrees of civilization.

The white population is remarkable in this, that it has remained comparatively free from the admixture of Indian blood. It is almost entirely Andalusian in origin, and retains its native activity and spirit of adventure. It is occupied chiefly in seeking for rubber in the forests toward the east, and in the province of El Beni, which bounds Vaca Diez on the north.

The territory of Santa Cruz exhibits a great variety of surface. It is generally believed that

this department is entirely covered with virgin forests and that it consists entirely of vast level plains ; as a matter of fact it contains mountainous regions, ranges of hills, forests, tracts of bush or scrub, and wide prairies, both on the plains and in the mountainous region. It is, above all, a country for raising stock and for the production of tropical fruits and vegetable products generally. Like Cochabamba, Santa Cruz feeds the Territory of Colonias and El Beni. The principal crops produced are maize, cotton (which grows profusely and gives an excellent yield ; there are several varieties in respect of colour, white and yellow predominating), rice, manioc, indigo, coffee, sugar-cane, cocoa, and many fruits, such as bananas, oranges, lemons, figs, pomegranates, melons, pine-apples, etc. Many textile plants are also grown ; and medicinal plants and shrubs, such as coca, yerba maté, which does excellently, quinquina, copaiba, sarsaparilla, ipecacuanha, vanilla, etc., as well as gum copal and rubber.

All kinds of wood for cabinet-work, timber for constructive purposes, and dye-woods abound in the forests. Among the dye-woods is the wood of a tree which the Indians of the country know as *miniati* or *tuminiati*, which has valuable properties for the dyer, being far preferable to tannin ; and it gives excellent results when employed in the preservation of leather. The vine has been neglected, but it grows in abundance. The hot, moist climate, in short, is one in which all manner of crops and fruits can be grown.

The department has hitherto been insufficiently surveyed, so that we have not much information as to its mineral resources. We know that petroleum is found there, and there are a few iron mines and quicksilver mines in the Valle Grande and the Cordillera which bounds the department ; there are gold mines also in the Cercado and silver mines in the

mountains of Colchis. Only labour and the means of transport are required to develop Santa Cruz.

The department contains several lakes, notably Lake Concepción ; also some well-known baths, such as those of Jarayes and Mandioré, and thermal waters, of which the best are those of Peseres. At Samaipata there is a curious pre-Inca monument, consisting of a hill symmetrically perforated ; particularly notable are seven concavities or deep doorways, in the entrance of which are great troughs of regular dimensions, like capacious baths or tanks. In the lower part of the hill there is a long, wide bench hewn in the rock.

In the province of Villa Grande, which lies among the last ramifications of the eastern Andes, are the summits of Duran and Parabano. On this latter, whose culminating peak overlooks the vast ocean of verdure which stretches away to the east, is a magnificent artificial platform, reached by a stairway which is now largely destroyed ; from this platform, according to tradition, the Sun was adored at the moment of his appearance above the middle of that vast green plain which stretched eastward as far as Paraguay. The magnificence of the view to be obtained from this height, and the symmetry and solidity of the work, make this platform well worth a visit.

X. The department of Santa Cruz is divided into six provinces. Of these we will give a few brief details.

Cercado is divided into two sections. The capital of the first section is also the capital of the department : the city of Santa Cruz. The capital of the second section is the town or village of Warnes, some 24 miles from Santa Cruz. Here the surface is absolutely flat and the climate tropical ; the rivers, among which are the Rio Grande, or Guapay, and the Piray, are well stocked with fish, while the forests

abound in all the species of the tropical American fauna. The chief product is sugar-cane.

Sara again is divided into two sections. The capital of the one is Portachuelo, 48 miles from Santa Cruz ; of the other, Buena Vista, 134 miles from the latter city ; it is a flat country, with a few hills in the south ; the climate and the products are the same as in Cercado. The rivers are the Mamoré, Sara, Guapay, Piray, and Yacapani ; and there is a lake, Palometas.

The province of Valle Grande is the most prosperous in the department. It lies entirely among the last ramifications of the eastern Cordillera. Divided into three sections, its capitals are the city of Valle Grande and the towns or villages of Samaipata and Comarapa. These lie respectively 165, 117, and 210 miles from Santa Cruz. The climate varies from hot to temperate ; the products are those of tropical valleys. The rivers are the Ichilo, the Moile, the Piray, and the Rio Grande, or Guapay.

Velasco, a province of vast plains with hilly ground in the south, is divided into two sections ; the capitals, San Ignacio and Santa Rosa, are 384 and 206 miles respectively from Santa Cruz. Products are tropical fruits, rubber, cattle, and gold. Velasco is watered by many rivers, including the Sara, the Grande, the San Miguel, the Blanco, the Paragua, and the Verde ; there are three lakes, Concepción, Miguelenos, and Chitiopa.

Chiquitos, whose capital, San José de Chiquitos, is 366 miles from the capital, is a province of plains and low hills ; the climate is hot and the products tropical ; it is also in part a cattle country. It is traversed by the Rios Guapay, Otuquis, Curichi, Quisere, and other affluents of the San Miguel, and contains several lakes : Uberaba, Gaiba, Mandioré, Caceres, and part of Concepción.

Cordillera, a vast province divided into three sec-

tions, with Lagunillas, Charagua, and Cabezas for capitals, is a country of wide plains, with a few hills in the west and a number of isolated mountains in the centre. It is watered by the Rios Guapay, Parapiti, and Otuquis, and contains Lakes Weddel and Paraguay.

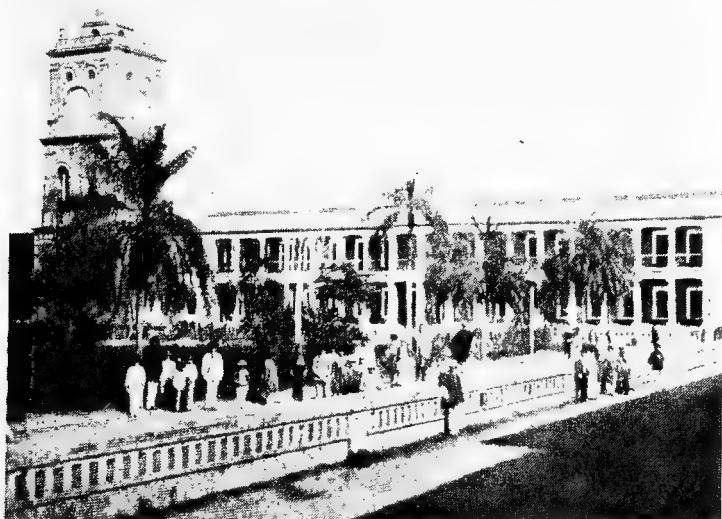
XI. Santa Cruz, or Santa Cruz de la Sierra, the capital of the department, was founded in 1545 ; it is situated on two of the great postal and commercial routes of Bolivia, those running into the Argentine and Paraguay. The city is 546 miles from La Paz by the Oruro-Cochabamba route and 329 miles from Sucre ; it lies at an altitude of 1,387 feet, near the Rio Espejo, or Piray, an affluent of the Rio Grande, or Guapay.

It is built on a wide plain, from which rise, at some distance one from another, a number of pleasant-looking country houses, and beyond these are sugar factories and plantations of sugar-cane. On the principal plaza, La Concordia, is the Government Palace, a large building with a double gallery or veranda ; also the Municipal Palace and the cathedral, which is in process of construction. Six churches and two chapels complete the list of the public buildings of Santa Cruz. The population of the city is estimated at 18,000 or 20,000, but there are barely 200 foreigners, and of these the majority are Italians.

The inhabitants of Santa Cruz are pleasant, intelligent, and hospitable, but somewhat indolent, doubtless because the climate is hot and the means of life easy to obtain. The half-breeds of the department—the offspring of the marriage of women of Guarani origin with the Spaniards—are men of fine proportions, almost white, with good features from the first generation. Their eyes are large, the colouring very light, the nose straight, the beard somewhat scanty.



A STREET IN SANTA CRUZ.



SANTA CRUZ. PLAZA CONCORDIA.

In Santa Cruz nearly all the private houses are provided with galleries or verandas, the roof of which is supported by wooden columns or uprights ; a precaution useful against the rain and sun alike. The streets are wide and straight ; they are laid out chessboard fashion, and are not paved, but are merely covered with a layer of sand. As rains are frequent, even out of the rainy season, and are then torrential, the streets are turned into veritable rivers of mud. The sale of food-stuffs is carried on in the streets, usually from carts mounted on two wooden wheels, each cut out of a single piece, and about 5 feet in diameter. These primitive vehicles, which are widely used in this country, are drawn by one or more yoke of bullocks or oxen.

Within the limits of the city is a curious lagoon, known as El Arenal, some 300 yards long and 130 wide.

Santa Cruz boasts of fifteen scientific and literary societies, the most important of which is the Sociedad Geografica e Historica. Six printing offices publish a dozen journals and reviews.

The local industries are tanning and the manufacture of boots and shoes, saddlery, carpets, ponchos, and blankets. There are also carriage-building works, cigarette factories, chocolate factories, ice factories, distilleries, sawmills and flourmills. In the surrounding district, as throughout the whole province of Cercado, there are numerous sugar refineries.

Santa Cruz has not a good reputation in the matter of salubrity. It is true that paludism prevails among certain classes of the population, but if we consult the table of births and deaths we shall find that the mortality is comparatively low. The truth is that the climate is on the whole excellent, although hot.

Santa Cruz is among the privileged regions of the earth in the matter of production. It furnishes with extreme abundance all the products of the vegetable

and animal kingdoms ; and stock-raising, which is at present too little practised, might be a flourishing industry. The lack of labour and capital, and also of means of transport, results in the retention of unprogressive and traditional methods of agriculture. There is a plethora of products which at present find no outlet, on account of the enormous cost of transport, which has risen, owing to the great quantities of alcohol and rubber which are carried, to a rate of 5 Bolivians per arroba, or 8s. for 25 lb., for the journey to Cochabamba. Prices are much the same along the Yacuiba route, across the Argentine frontier by mule and bullock-cart, and for Puerto Suarez on the Paraguay.¹

XII. The department of Santa Cruz contains only one centre boasting the title of city—namely, Valle Grande. The other centres of population are the provincial capitals and Puerto Suarez, a port on the Rio Paraguay, which politically belongs to the province of Chiquitos. From Santa Cruz a number of highways or trade routes set out for the various provincial capitals, for the great navigable rivers, now served by steamers, and for Cochabamba and the frontiers of the Argentine and Paraguay. There are in the capital various navigation agencies in connection with the eastern river routes, transport companies in connection with the route to Puerto Suarez, and the trade routes of the department itself ; and commission houses, export and import, which undertake the forwarding of travellers' merchandise and facilitate commercial transactions. The means

¹ One result of this lack of cheap transport is that certain articles are fairly cheap in Santa Cruz. White sugar, for example, is only 8s. per arroba of 25·4 lb., and husked rice the same. Other staple articles of food are sold for the following prices per arroba : Charque (dried salted meat), 8s. 10d. ; coffee, 13s. 1½d. ; lard, 25s. 7d. ; potatoes 6s. 1d. ; while good fresh meat is 6½d. to 7d. per lb., wheat flour, 48s. per 55 litres (about 11½ gallons), tobacco, 1s. 3½d. the roll, etc.

of transport are mules and the heavy bullock-wagons ; and bullocks are also ridden, replacing the horse, as they are better able to make their way through the mud of inundated tracts. The roads (if one can call them that) of this part of Bolivia, as of others for that matter, are interrupted, after the rains, by long stretches of swamp or water, which are too much for a horse.

Communication between Santa Cruz and La Paz, as we have seen, is effected by way of Cochabamba and Oruro. We have already spoken of the route from La Paz to these two cities, and the means of transport. From Cochabamba to Santa Cruz the distance is 277 miles, and the journey must be made on mule-back. It is, as the Bolivians themselves confess, one of the most difficult journeys in the whole Republic, and it has never been possible to establish a diligence owing to the natural conditions of the soil, which is for the most part undulating and unfavourable to traffic. The journey is seldom effected in less than twelve days.

From Santa Cruz to Puerto Suarez on the Paraguay is a distance of 390 miles. This must, as on the preceding route, be covered in the saddle, the mount being either a mule or, better, a bullock. Baggage and merchandise is carried by pack-mules or bullocks, or drawn in the country carts already described. From these details the reader may judge of the quality of the roads, which plunge into forests and swamps and cross barren plains and wide tracts of scrub. Despite these difficulties, the Puerto Suarez route is that principally favoured by the trade of Santa Cruz ; by this route the rubber, sugar, coffee, and other products of the department are exported, and European imports introduced. The custom house at Puerto Suarez records the importation of 1,340 tons of merchandise in 1911, its value being £85,545, an increase of 353 tons and £25,087 over the figures

for 1910. Exports amounted to no more than 182 tons and £62,838, or some 30 tons less than in 1910, when the value of the imports was £68,036.

XIII. Puerto Suarez lies to the south of the great bay¹ of Caceres or Tamengo, facing Corumba, an important Brazilian port and city in the State of Matto Grosso, on the Rio Paraguay. This point will presently be attained by the North-Western Railway of Brazil, which crosses the States of San Paulo and Matto Grosso, connecting the Rio Paraguay with the port of Santos. The seven miles dividing Puerto Suarez from Corumba are covered in two hours by means of steam-launches. The bay of Caceres, on which the port is situated, communicates with the Rio Paraguay by way of the Tamengo channel, which is narrow and tortuous ; sometimes the water flows from the bay to the river, and sometimes from the river to the bay, according to the season ; and the channel, in which the water is not always sufficient for all draughts, is full of floating masses formed of algæ and weeds, which are known as *camalotes*. In the bay, which is covered with these islands for nearly a third of its surface, these *camalotes*, mingled with shrubs, lianas, and all sorts of vegetable growths torn from the banks, form floating islands which are often three or four hundred yards in diameter and more than twelve feet in thickness. The formation of these islands, which float at random and move with the wind, is incredible to one who knows nothing of the exuberance of tropical nature.

The population of Puerto Suarez consists of whites, Indians, a certain number of immigrants from the Brazilian shore, and a small Bolivian garrison. The climate is definitely hot as long as the sun is shining, but at night the temperature is quite moderate. The port contains several important trading houses ; the

¹ (A lake, or *bayou*, as it would be called in the United States.—TR.

two leading firms are German, and are those which send or receive merchandise by means of the steamers for Corumba, a port which up to the present time receives all cargoes intended for Puerto Suarez.

The trader who wishes to introduce his goods into the department of Santa Cruz must engage *freteros* or freighters, otherwise muleteers, or drivers of bullocks and the country carts of this region. With muleteers he will sign a contract giving forty days' grace, or if carts are the medium of transport the term is five months. The cost of transport varies according to the season ; as a rule one pays 32s. to 40s. per Spanish quintal (about 101 lb.) as far as Santa Cruz ; if pack-mules or bullocks be stipulated the cost is about 2s. 6d. more. The journey is made within the time agreed upon when the roads are good ; that is, when the rains and floods have not been excessive, or when the droughts have not been too severe ; for in time of flood it sometimes happens that the carts remain stuck in the mud for an indefinite period. The great mortality to which the pack animals are subject makes it impossible always to find carriers, so that goods may be hung up for indefinite periods.

The drawbacks to the Puerto Suarez route will presently be remedied by the construction of the railway which has recently been projected between Santa Cruz and the Paraguay. However, this railway cannot be completed for several years, and when it is built the port ought to be moved a considerable distance to the south.

XIV. The department of Tarija, which lies in the south of Bolivia, is contained between the departments of Potosi, Chuquisaca, and the Argentine Republic ; it is traversed and bounded by watercourses of comparative importance. Its altitude varies from 223 to 12,874 feet, and its total area is 70,688 square miles, of which 57,367 belong to the province, provisionally

the Territory, of the Gran Chaco. Its population amounts roughly to 120,000.

Tarija, in our opinion, is that province which will, after that of Cochabamba, undergo the greatest development when the railway now approaching from the Argentine has reached it, and when it is connected with the principal Bolivian centres by the La Quiaca-Tupiza-Uyuni railway. The construction of the La Quiaca-Tarija branch, 130 miles in length, is now under survey. It is more than probable that a portion of this region will be first exploited by Argentines and Europeans.

The western portion of Tarija is occupied by the outermost spurs of the Cordillera, which at this point consists of chains of precipitous mountains, interspersed by valleys and ravines of extreme fertility.

The climate is varied ; very hot and damp in the lower portions, mild and equable in the western part of the country. The products of the department are as varied as its climate ; all the crops and fruits of the semi-tropical and temperate zones can be produced. Grain and fruits of all kinds are abundant in Tarija. The vine does very well, and wine has been made for a long time, not more than passable in quality, for lack of knowledge and equipment ; but in the future the vineyards of Tarija may be one of the great resources of the department. Stock-raising again is practised, but on too small a scale ; however, it may well become one of the chief industries of the future.

The mineral-bearing measures of the department have so far been little prospected, although they are visible at many points. Moreover, Tarija has been classified as forming part of the so-called "silver region" of Bolivia ; other portions are the south-eastern portion of the department of Santa Cruz and the eastern portion of Chuquisaca and Potosi ; the total area of this region is more than 115,000 square miles.

Not only silver and copper have been discovered, but numerous auriferous measures. These minerals have not always as yet been the object of serious exploitation, any more than the forests of quebracho on the banks of the Pilcomayo. The sole vegetable resources at present are the agricultural products, and the Argentine is the great outlet for these ; which means that the trade of the department is comparatively limited.

The department of Tarija is divided into six provinces, the sixth of which, the province of the Gran Chaco, has since 1905 been constituted the Territory de Colonias del Gran Chaco. Let us rapidly pass these provinces in review :—

Cercado has its capital at Tarija, which is at the same time the departmental capital. Tarija is 592 miles from La Paz by the Tupiza-Uyuni railway and the Antofagasta-Oruro-La Paz line, and 248 miles from Sucre. The surface of the province is uneven, and a varied climate favours all products natural to high table-lands and valleys. It is watered by the Rios Tarija, San Lorenzo, and Chaguay.

Mendez has its capital at San Lorenzo, 10 miles from Tarija ; Avilez at Concepcion, 20 miles from Tarija ; O'Connor at Entre Rio (formerly San Luis), 145 miles from Tarija. Among the rivers which water these provinces may be named the San Juan, Camblaya, Livilivi, Pilaya, Pilcomaya, San Luis, etc.

The province of Arce has its capital at Padcaya, 41 miles from Tarija ; its surface is uneven, and favourable to stock-raising ; the products are the same as those of the other departments ; the rivers are the Condado, Tarija, and Bermejo.

XV. Continuing the department of Tarija towards Paraguay is the province of the Gran Chaco, declared the National Territory de Colonias for five years in 1905, a date since prorogued ; the total area is 57,365 square miles, and the population less than

20,000. This region, which is still imperfectly surveyed, forms a belt of low-lying plains, almost horizontal in the east and slightly broken up in the west ; it is covered with natural prairies and comparatively open forests, the flora of which hardly ever varies ; they contain palms, carobs, willows, cedars, and on the banks of the Pilcomaya the quebracho. A great proportion of the plains is invaded during the rainy season (December to March) by a layer of water 4 to 16 inches deep. Here and there, towards the north-east, are a few tracts of hilly ground, the refuge of tribes of Tobas, Chorotis, Chamacocos, and other Indians, who live in a more or less savage state.

As we have already mentioned, certain Franciscan missions, subsidized by the Government, are endeavouring to gather these Indians about them ; not entirely without success, for several of these missions are fairly prosperous. The Indians are employed in agriculture.

Yacuiba, 218 miles from Tarija, and near the Argentine frontier, used to be the capital of the province of the Chaco, but the seat of the administration has now been removed further to the north, to Villa Montes. Other centres of population such as Crevaux, Itau, Carapari, Murillo, etc., are progressing day by day.

Yacuiba, which should soon be reached by the Argentine railway coming from Embarcacion (which will eventually cross Bolivian territory to reach Santa Cruz), will nevertheless remain the most important centre of the territory. It is by means of Yacuiba, in short, that the province of O'Connor and the Gran Chaco are reached ; that is to say, the exuberant and so far unexploited reserves of the Bolivia of the future, as well as the province of Azero in the department of Chuquisaca and the eastern provinces of Santa Cruz.

Already the attention of certain Argentine capitalists has been directed to this region on account of its proximity to the rivers Pilcomaya and Paraguay. Their experiments are justified by the intrinsic wealth of this region, especially as a stock-raising country ; moreover, in order to make access easy to the Argentine territory on the right bank of the Pilcomaya the Argentine Government has decided to spend five millions of piastres for the purpose of making this river navigable over a large part of its course, as far as the 22nd degree of South latitude. This sum will be spent on the building of canals, dredging, and the clearing of various parts of the channel which are at present obstructed by trees or tangled roots.

XVI. Tarija, the capital of the department, was founded in 1574 on the right bank of the Rio Grande de Tarija, the left branch of the Bermejo, which is a tributary of the Paraguay and so of the Parana. Its altitude is 6,418 feet ; its site is excellent ; its climate mild and healthy, the average annual temperature being 64.4°. Severe cold is unknown ; it rarely freezes, and the heat is always moderated by breezes coming from the neighbouring Cordilleras. The rains are distributed with a certain regularity over the year, and show a tendency to decrease, which may be due to the destruction of the forests. During the rainy season violent thunderstorms are frequent.

The city has a modern aspect ; it is spacious and well planned, with very clean and well-paved roads ; they are lit by gas, but electric light is now being installed. The houses, without being beautiful, are well-built and cheerful-looking ; the chief buildings are the theatre, the Prefecture, the Palace of Justice, a University Hall, and the old convent of San Francisco. The principal plaza, named after Luis de Fuentes, the founder of the city, is abundantly provided with an excellent water supply, which comes from Erquis, a point some six miles distant. This

water is distributed to numerous public fountains and private houses.

Tarija has at present a population of 9,000 to 10,000 inhabitants, consisting largely of whites of Spanish origin with a slight admixture of Indian blood. On the whole the Indian element is not at all largely represented in this community, which is destined to undergo a rapid increase. The manners and customs prevailing are similar and are indeed related to those of the Northern Argentine, for until 1826 this department formed a part of Argentina. The number of foreigners increases daily ; there are already nearly 400 belonging to various nationalities ; the most numerous are the Argentines, then the Italians, then the Spanish and the French.

Industry has not yet acquired any great importance in this city, which will for some time longer be somewhat isolated from the principal centres of the Republic ; there are a few cigarette factories, whose products are much in favour, some tanneries, some fruit-drying establishments, and several flourmills. Embroidery, very carefully executed, is another local industry. The articles exported from Tarija are principally flours, maize, hides and leather, rubber, and cocoa.

In the plain of rounded pebbles and alluvial deposits which surrounds Tarija are found an abundance of bones of mastodons and other antediluvian animals. A small museum has recently been founded in the city, which contains the bones and skeletons so discovered.

Communication with the interior of the country is effected by way of Tupiza, a journey of 112 miles, occupying two days by diligence or on mule-back ; or by way of La Quiaca, the frontier town where the Central Norte Argentino railway terminates, by which one can reach Buenos Ayres in two days. The 82 miles between Tarija and La Quiaca may be

covered by diligence in a day and a half. From La Quiaca to Tupiza is 57 miles ; thence one may proceed to Uyuni. From Tarija to Sucre is 250 miles, a relatively easy journey of eight or nine days on the back of a mule, as the track passes through a certain number of more or less important and comparatively civilized centres.

A branch line intended to unite La Quiaca with Tarija is at present projected and the preliminary survey is going forward ; its execution will greatly increase the commercial activity of the city and the department, and will notably increase its resources and the value of the land. At present Tarija is the only community in the department which bears the title of city.

CHAPTER XIV

BOLIVIAN RAILWAYS

- I. The development of the railway systems in Bolivia.—II. Lines open to traffic ; under construction, surveyed, and projected.—III. A few details as to the lines running into Potosi, Cochabamba, Tupiza, and Arani.—IV. The Arica-La Paz line ; the Corocoro branch. Other lines.—V. The Madeira-Mamoré line. The Guayramerim-Riberalta branch.—VI. The results to be anticipated from the Bolivian railways.

I. FOR many long years, until the advent in power of Señor Ismaël Montes, the successor of General Pando, Bolivia had not been able to give the question of public works all the attention that was desirable, but had to confine herself to keeping in good order such as already existed, as far as the means at the disposal of the Treasury would permit. At that time only one railway was working—that from Antofagasta to Oruro, 303 miles of its total 573 being on Bolivian territory.

During the first presidency of Señor Montes and that of Señor Villazon, the ways and means of access to the interior underwent a great improvement, these two statesmen having undertaken the execution of a great programme which is well worthy of attention. The question of ways and means of communication, of railways more especially, is one of peculiar and prime importance to Bolivia, a country in which the creation and upkeep of roads would be even more costly than the construction of railways ; it was

therefore of the utmost importance to endow Bolivia as soon as possible with a network of railway systems. The execution of this plan, which is now being accomplished, has been retarded only by the lack of resources.

The construction of the railway from Lake Titicaca to La Paz was the first link in the systematic programme conceived by the two Presidents. By a law of the 25th of September, 1900, all the revenue proceeding from the *régie* of alcohols and brandies and the export duties on rubber exported from the department of La Paz were appropriated for the construction of the railway from Guaqui to La Paz. Once this line had been brought as far as the Alto overlooking the city the descent was facilitated by the construction of an electric railway of six miles in length.

The revenues indicated becoming available for the construction of other lines, especially as the lines already built could be sold or mortgaged for the same purpose, the Government proceeded to the extension of the railway from Oruro to Viacha, at which point it joined the Guaqui line. Thanks to the completion of this line, which is 125 miles in length, La Paz was directly connected with two ports on the Pacific coast, Antofagasta and Mollendo.

Since then the programme has been greatly enlarged. This extension was facilitated by the conclusion of a treaty with Brazil in 1903, and another with Chile in 1904, and finally by the sale of the Guaqui railway in 1910 to the Peruvian Corporation, Limited. The Government, offering the purchase price as guarantee, and having its revenues free, was able to appeal to European capital for the construction of all that extensive railway system which was judged indispensable.

In conformity with the established programme the Government proceeded simultaneously with the con-

struction of the following lines, starting from the principal trunk line from Ollagüe to La Paz, and counting from south to north: the Uyuni-Tupiza branch; the Rio-Mulato-Potosi branch; the Oruro-Cochabamba branch; and the line from Viacha to La Paz with its extension towards the Yungas. At the same time, in conformity with the treaty entered into by Bolivia and Chile, the international railway from Arica to the Alto of La Paz was constructed.

II. Here are some data respecting the condition of the Bolivian railways at the end of the year 1912:—

LINES OPEN TO TRAFFIC.

The Antofagasta and Bolivia Railway Company.

From Antofagasta to Oruro¹—

| | | | | | |
|---|-----|-----|-----|-----|-----------|
| Bolivian section | ... | ... | ... | ... | 303 miles |
| Guaqui to La Paz, ² including the electric section | | | | | |
| from the Alto | ... | ... | ... | ... | 61 " |
| Oruro to Viacha ³ | ... | ... | ... | ... | 125 " |
| Arica to La Paz, 272 miles— | | | | | |
| Bolivian section to the frontier at Viacha | ... | | | | 144 " |
| Rio Mulato to Potosi ⁴ | ... | ... | ... | ... | 108 " |
| Viacha-La Paz by the Kenco | ... | ... | ... | ... | 18 " |
| Uyuni-Huanchaca branch | ... | ... | ... | ... | 20 " |
| Electric railway from Cochabamba to Vinto ⁵ | ... | ... | ... | ... | 15 " |

Total 794 miles

¹ Gauge 24·6 inches (·75 metre) being converted to 1 metre (39·37 inches).

² Gauge 1 metre. Built by the Bolivian Government and sold July, 1910, to the Peruvian Corporation.

³ Gauge 1 metre. Constructed by the Bolivian Railway, an English company, according to contract with the Bolivian Government.

⁴ Also constructed by the Bolivian Railway, according to contract, and opened to traffic in May, 1912.

⁵ A Bolivian enterprise, the *Compañía Luz y Fuerza Cochabamba*.

UNDER CONSTRUCTION.

| | | | | |
|---|-----|-----|-----|-----------|
| Oruro to Cochabamba ¹ | ... | ... | ... | 121 miles |
| Uyuni to Tupiza | ... | ... | ... | 120 " |
| Electric railway from Cochabamba to Arani | ... | ... | ... | 35 " |
| Corocoro branch | ... | ... | ... | 5 " |
| Guayramerin to Riberalta | ... | ... | ... | 53 " |
| Total | ... | ... | ... | 334 miles |

LINES SURVEYED.

| | | | | |
|-----------------------------|-----|-----|-----|-----------|
| Puerto Suarez to Santa Cruz | ... | ... | ... | 423 miles |
| La Quiaca to Tupiza | ... | ... | ... | 57 " |
| Total | ... | ... | ... | 480 miles |

LINES AUTHORIZED AND UNDER SURVEY.

| | | | | |
|--|-----|-----|-----|-------------|
| La Paz to Puerto Brais (Rio Beni) through the Yungas | ... | ... | ... | 232 miles |
| Cochabamba to Rio Isiboro | ... | ... | ... | 149 " |
| Branch from last line to Santa Cruz | ... | ... | ... | 186 " |
| Potosi to Sucre | ... | ... | ... | 110 " |
| Sucre to Lagunillas and Charagua | ... | ... | ... | 124 " |
| Yacuiba to Santa Cruz (on the Rio Grande) | ... | ... | ... | 459 " |
| Machacamarca to Uncia | ... | ... | ... | 51 " |
| Arani to Totora | ... | ... | ... | 56 " |
| La Quiaca to Tarija | ... | ... | ... | 130 " |
| Total | ... | ... | ... | 1,497 miles |

A line projected is that from Charana (a frontier station on the Arica railway) to Oruro ; a distance of 149 miles.

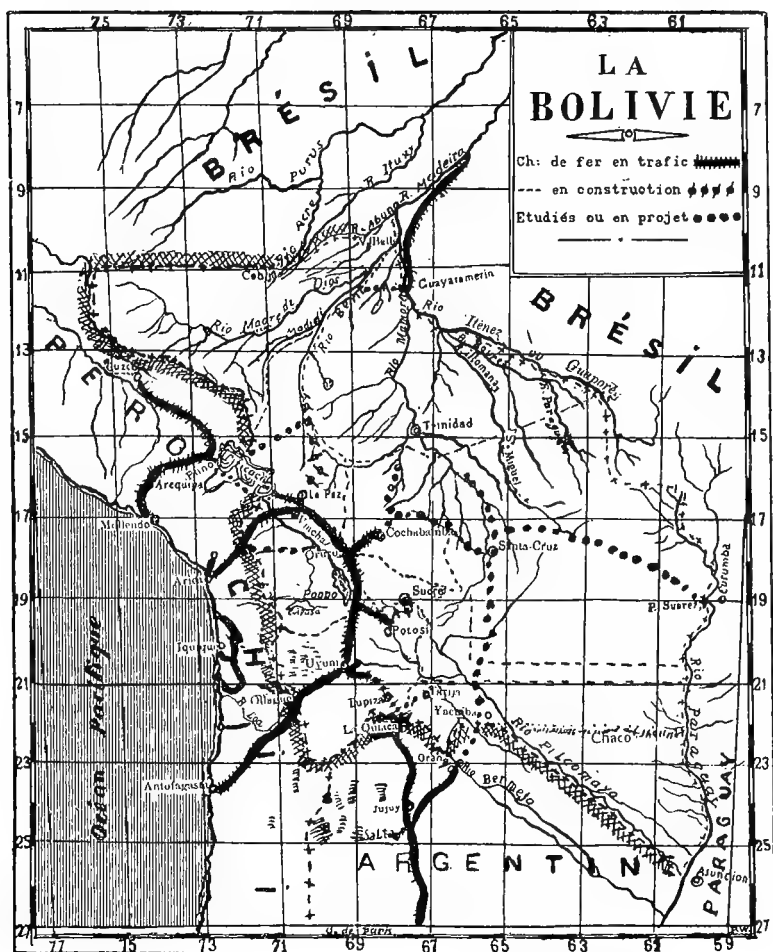
This gives us a total of : Lines constructed, 794 miles ; lines under construction and approaching completion, 334 miles ; lines authorized and surveyed, 480 miles ; authorized and under survey, 1,497 miles—a total of 3,105 miles of railway either built or to be built, in realization of the Governmental programme. We must add to these the projected line which will run round Lake Titicaca and unite Puno and Guaqui by land, which will be not less than 144 miles in length.

¹ Being constructed by the Bolivian Railway according to contract, as is also the line from Uyuni.

III. The line or branch line running from Rio Mulato to Potosi, a distance of 108 miles, was officially inaugurated on the 14th of May, 1912, towards the end of our stay in Bolivia. The journey occupies six hours. This railway, which cost £1,125,000 sterling, is perhaps the most elevated in the world, for it crosses the Cordillera de Los Frailes at an altitude of 15,809 feet. Veins of tin and silver abound in the region traversed by this railway, to say nothing of the prodigious reefs of the Cerro de Potosi, which have hitherto only been worked in the richest portions, and will now acquire a new value, since the new line will obviate the heavy expenses of primitive transport by pack-saddle and llama or the primitive bullock-carts, and the exploitation of silver, which at the ruling prices was no longer remunerative, will now, thanks to the diminution of the costs of transport, undergo a definite revival.

The line from Oruro to Cochabamba, which will be 121 miles in length, was completed for 67 miles only at the time of our journey; its completion has been delayed by a number of difficulties. According to competent informers this piece of work was one of the most difficult and arduous in the history of South American railway construction; in the first place a laborious survey was made over an extremely mountainous route, consisting of high mountains, yawning ravines, rivers, etc., then the bridges, rock cuttings, tunnels, and masonry work demanded a considerable expense both of time and money. The cost of the line amounted to an average of £16,000 sterling per mile, and even more for the section between Mount Conacona and Vintilla. From that point the track presents fewer difficulties.

This branch, which was to be opened at the end of 1913, will serve a wonderful agricultural region, which hitherto has been desert and uncultivated,



owing to the lack of cheap transport to the great centres of consumption. There are no industries in this region, but once the railway is in working order the exploitation of many tin and silver mines, now abandoned or undiscovered, will be a simple matter.

The branch from Uyuni to Tupiza (120 miles) is of considerable importance to the country, as it runs in the direction of the Central Norte Argentino railway, which terminates on the frontier, at La Quiaca. It will be of great service both to agriculture and the mining industry, both of which are at present in a merely embryonic state, as in other inaccessible parts of Bolivia. The strike of English coal miners, in 1912, caused a delay in the delivery of material, and work had to be suspended; at the time of our journey the line was completed for a distance of 60 miles, but no section was open to traffic. This branch should be completed about the same time as the last.

The electric railway which will unite the valley of Quillacollo with that of Cliza, known as the Vinta-Arani railway, will have a length of 56 miles; of this the first portion is completed and the second well advanced. The opening of this line will contribute greatly to the development of the wealthy and magnificent region which it traverses, and will exert a beneficial influence over the agriculture and the mining industry of the neighbouring country-side.

IV. It is needless to insist on the great importance to Bolivia of the opening of the Arica-La Paz railway. The official inauguration took place in March, 1913. This line, 272 miles in length, of which 144 miles are on Bolivian territory, enables the traveller from the coast to reach La Paz in 12 or 14 hours instead of the 48 hours necessitated by the Antofagasta and the 36 hours by the Mollendo route.

This line, cut through a huge range of granite, had to cope with considerable natural difficulties

over nearly 240 miles of its length. At the outset, when the rail-head had progressed a certain distance from the coast, all water required had to be brought on the backs of pack-mules, and this water cost as much as 3 francs per skin ; however, the engineers contrived to procure water, by a system of pipes over 70 miles in length, from the region of eternal snows. At Mount Tacora, this line, which for 28 miles of its length is a rack railway, attains the highest point of the traverse, at an altitude of 13,921 feet. To diminish the effects of the *puna* or mountain-sickness in the case of persons with weak hearts the company has provided its cars with compartments equipped with oxygen. At Tacora are the richest veins of sulphur in the world ; the upper seam alone is estimated as containing 10 to 20 million tons of the crude mineral, giving an average of 75 per cent. of ordinary sulphur. The Italian sulphurs, which used to rule the market, will find a formidable competitor in Tacora sulphur.

The Arica railway also passes close to some of the richest deposits of copper in the world ; far superior in importance, contents, and wealth to those of Lake Superior in the United States, namely, the mines of Corocoro. In 1911 they sent to the coast, by means of bullock-wagons, a quantity of mineral representing a value of £640,000. They lie at a distance of five miles from the new line, with which they are about to be connected by means of a branch line, the construction of which has already been commenced.

That powerful company, the Bolivian Railway, Limited, which has executed several contracts for the Bolivian Government, has connected its systems by the extension running from Viacha to La Paz. The line from Antofagasta to Oruro and La Paz thus enters the capital to-day on its own metals, without being obliged to make use of the track of the Peruvian Corporation's railway. Two railways

now reach La Paz : the Guaqui railway, coming from the north, and the Antofagasta line, coming from the south, the former being an electric railway.

The line running to the Yungas is the prolongation of the line from Viacha to La Paz. While the construction of this line is being carried forward into the heart of this wealthy region the survey is being made for its inevitable prolongation to Puerto Brais, a point on the Rio Beni which is open to navigation at all seasons of the year. The construction of the first portion of this line is guaranteed by the sums remaining available after the completion of the Cochabamba, Potosi, and Uyuni-Tupiza railways.

The construction of the Potosi-Sucre line, for which the Government resorted to the product of the sale of the Guaqui-La Paz railway, has also been entrusted to the Bolivian Railway Company, which has always the preference on account of its previous successful efforts.

Besides the railway from Yacuiba to Santa Cruz de la Sierra, which traverses a fertile country which should be easily developed, and that from Santa Cruz to Paraguay, which should be no less valuable, the Bolivian Chambers have sanctioned the law amplifying the contract entered into by Señor Simon Patino, the great Bolivian capitalist, for the prolongation of the railway from Cochabamba to Santa Cruz and the Rio Isiboro, and from Santa Cruz to Lagunillas.

V. Although it is not located on Bolivian territory, we must not fail to mention the famous Madeira-Mamoré railway, which will enormously favour the development of one of the largest and most fertile portions of Bolivia, which is at the same time that most remote from the central administration.

This line, which covers a length of 227 miles, and is built through the heart of the virgin forests of the Amazon, represents an enormous sum of

persevering labour, of which, despite description, one can really form no exact idea unless one has visited these countries, in which Nature and the elements have several times inflicted upon the company concerned an often prophesied check. One cannot too warmly congratulate the energetic engineers of the Madeira-Mamoré railway on their triumph over Nature ; thanks to them it is now possible to evade the terrible falls of the Madeira, and complete in twelve hours a journey which, undertaken by ascending the river under favourable conditions, demanded several weeks of navigation of the most perilous description.

This line renders the Atlantic directly accessible to the products of Eastern Bolivia, and in the near future, when the Cochabamba-Isiboro railway is built, it will be possible to go in 25 or 26 days from La Paz to Europe, by the Madeira-Amazon-Para route. The Madeira railway will be completed, as far as Bolivia is concerned, by a railway whose construction has already been commenced, from Guayaramerim to Riberalta, a point on the Rio Beni, whence the river is navigable as far as Puerto Brais, and even to Rurenabaque, a distance of 473 miles.

According to an agreement concluded in 1910 between Bolivia and Brazil, the latter country accorded to the former, in perpetuity and independently of all treaties, the free navigation of the Acre, the Madeira, the Amazon, and the Paraguay ; a declaration which has not yet been made by Brazil in any other international document. Bolivia was thus placed on the same footing as the Amazonic States. On the 30th of December, 1912, a fresh agreement was signed between Brazil and Bolivia, to replace that of the 14th of November, 1910. It stipulates that the branch of the Madeira-Mamoré railway which Brazil was obliged to construct between Villa Murtinho and Villa Bella, conformably with Article 7 of the treaty of Petropolis (17th of Novem-

ber, 1903), shall now start from Guajara-Assu, or any other centre conveniently near Guayramerim.

By this novel arrangement Brazil has no further responsibility in the matter of the Bolivian railway system between the left bank of the Mamoré and the right bank of the Beni, the cost of such lines falling entirely on Bolivia. It is of this last line that we have already spoken.¹

A certain number of projects for the construction of other railways have been submitted to the approbation of the Chambers, and surveys have been made ; the total would amount to some 7,500 miles. We need not go into these ; the majority are mere speculations ; moreover, the programme and the projected routes of the Bolivian railways vary each year according to circumstances.

VI. And what results may we expect from the railways of Bolivia?

To judge by the example of the line connecting Oruro and La Paz, which for several years was supposed to be on the brink of insolvency, but which, on the contrary, was earning profits, although the region through which it passes is by no means productive, it is allowable to display a certain optimism. Although it is highly probable that the great trunk lines to be built—such as that between Yacuiba and Santa Cruz and that extending from the latter city into Paraguay—may require to be supported by Governmental subsidies, there are others, such as the

¹ In order to augment and reorganize the steamboat service on the Amazon and its affluents, an Anglo-Brazilian-Bolivian syndicate has acquired the stock and equipment of the Amazon Steam Navigation Company, which possessed a large number of steamers but allowed the service to become defective. The new syndicate consists of Suarez Brothers, of London and El Beni, the Booth line of steamers, Liverpool, and Mr. Percival Farquhar, representing the financial group of that name, who is the chief shareholder in the Madeira-Mamoré railway ; and a number of other capitalists of Paris and London.

Potosi-Mulato line, which, by transporting immense quantities of minerals, will undoubtedly yield a high rate of interest from the outset. It will be the same in the case of the Cochabamba railway ; the development of the agricultural region traversed will provide ample freights, without counting on the mining industry ; and the Uyuni-Tupiza line, once connected with La Quiaca and the Argentine systems, will be assured of a great international and regional traffic.

After a few years it is probable that even the least advantageous of these lines will suffice to themselves. In the case of the Yungas railway, the farther it pushes toward El Beni the higher will be its dividends. Simultaneously with the railways industries will be created and new regions will be opened up to cultivation ; while interdepartmental and international relations will alike be enlarged. The future of the Bolivian railways is, we consider, assured. It will merely be a matter of time for the less fortunate.

In the meantime, as the capital employed is assured of a guaranteed 5, 6, and even 7 per cent., the investor can wait in peace ; he has the future before him. For the capitalist the investment of money in the construction of Bolivian railways, whether directly or in the shape of a loan, is manifestly a very desirable investment, for the guarantees are undeniably excellent.¹

¹ Hitherto the English capitalists seem to have been the chief investors in the Bolivian railways. The English capital thus employed may be estimated at some £6,000,000 sterling, a figure considerably higher than that usually quoted. This is because the capital of the Antofagasta line (the Chilian section) and the Bolivian Railway Company are regarded as capital invested in Chile. In reality a great part of this capital, quite £700,000 or £800,000, is applied to the Bolivian line, and Bolivia may also claim a portion of the capital of the Peruvian Corporation. The French capital invested in various Bolivian industries amounts to about £3,000,000 ; the German to about £1,000,000.

CHAPTER XV

TRAVEL AND TRANSPORT BY LAND AND WATER

- I. The Bolivian roads ; their quality ; how they are maintained.—II. Mule-tracks. Crossing rivers and torrents.—III. Travel in the dry season the best.—IV. Relays or posting-stations. What may be obtained there.—V. What one ought to find there ; mules and postilions. Table of distances between the various departmental capitals.—VI. The river routes or waterways. The improvement of navigable rivers. Obstacles to navigation.—VII. Conditions of navigation on certain rivers. The Titicaca fleet.—VIII. The navigation of the Mamoré and its affluents ; the Itenez.—IX. Peculiar local boats or rafts ; the *balsa* and the *callapo*.—The rivers of the Territory of Colonias.—X. Navigation of the Beni and its tributaries ; the Madre de Dios, Orton, etc.—XI. Dangers and difficulties of travel in the interior. Picturesque and unusual routes.—XII. Pleasures of travel in favourable weather. The poetry of the wilderness.

I. ALTHOUGH the railways of Bolivia have made remarkable progress, and are now serving or will shortly serve all the most densely peopled towns and regions of the Republic, it is also true that as yet they cover only a very small portion of this great country. Where modern means of transport are lacking or costly the traffic between one town and another is effected by means of carriage, or rather wagon roads (*carreteros*), or mule-tracks (*de herradura*), which are generally bad, in spite of the large sums expended by the Government in the construction of some of these routes.

There are indeed few countries in which the con-

struction and maintenance of roads practicable to wheeled traffic is more difficult than in Bolivia. This is due to the geological formation of the country. Occupying as it does the most elevated region of South America, the higher regions tend to wear down under the action of the torrential rains. We must not therefore be astonished that Bolivia has no real roads or highways worthy of the name ; those roads which have been constructed between the principal departmental capitals are practicable to wheeled traffic only for six or seven months in the year, and are at their best only during the dry season (July to November). There can be no question of opening up such roads as we see in Europe ; they would cost at least as much as the railways, and would never render the same services nor pay the same dividends.

Until the railway system has thrust its ramifications in all directions Bolivia must content herself with the more or less provisional roads which she already possesses, while endeavouring, since they cannot be made permanent, to improve them as much as is possible and in accordance with the resources available for the purpose.

According to the documents of the Oficina de Estadísticas y Estudios Geográficos, the most important roads now existing in the Republic are those shown in the table on p. 249.

The quality of these roads is entirely comparative. They are of two categories, national and municipal, accordingly as they are made and maintained by the Government or by the municipalities, by means of budgetary appropriations or by the *prestación vial*, an impost or *corvée* by which the Indians are forced to give two days in the year (and often more) to the Government and two to the municipality. Inhabitants not subject to the *corvée* pay a tax of 2 francs for the upkeep of the routes connecting

the various cities and mining centres of the Republic. The personal *corvée*, which in years gone by doubtless had its justification, is not of much service to-day in the matter of maintaining the roads. The days on which the Indians are called up are for them occasions of drunkenness, as the *alcaldes* and *ilicatas* are usually obliged to make a distribution of alcohol, without which the work would be executed with the negligence which characterizes the Indian. It is true that when they are drunk their work leaves almost as much to be desired.

BOLIVIAN HIGHWAYS.

| | | | | |
|---|-----|-----|-----|-------------|
| Santa Cruz to Puerto Suarez | ... | ... | ... | 390 miles |
| Santa Cruz to Yacuiba | ... | ... | ... | 373 " |
| Sucre to Challapata (diligence) | ... | ... | ... | 211 " |
| Sucre to Cochabamba (diligence) | ... | ... | ... | 168 " |
| Potosi to La Quiaca | ... | ... | ... | 165 " |
| La Paz to Oruro (diligence) | ... | ... | ... | 149 " |
| Uyuni-Tupiza-La Quiaca (diligence) | ... | ... | ... | 200 " |
| Sucre to Potosi (diligence) | ... | ... | ... | 75 " |
| La Paz to Corocoro | ... | ... | ... | 77 " |
| La Paz to Achacachi | ... | ... | ... | 69 " |
| Oruro to Challapata (diligence) | ... | ... | ... | 69 " |
| La Paz to Puerto Perez (diligence) | ... | ... | ... | 44 " |
| Tarija to San Lorenzo (carriage) | ... | ... | ... | 9 " |
| Cochabamba to Sacaba (carriage) | ... | ... | ... | 6 " |
| Puerto Ballivian to Trinidad (carriage) | ... | ... | ... | 6 " |
| Other roads | ... | ... | ... | 62 " |
| Total | | | | 2,073 miles |

All that is done on such occasions is the removal of a few stones or lumps of earth or spadefuls of mud, which are placed at intervals to mark the width and direction of the road. Beaten down by the passage of animals and wagons, the road is relatively passable during the dry season; but on the high table-land, and wherever the ground is fairly level, the road is marked out on the natural surface of the soil; there is no attempt at metalling or making the surface in any way; so that during

the rains it naturally becomes a sort of drain which fills with surface-water, or even a watercourse, so that the waters scour it still deeper and make muddy bog-holes in every hollow. It would probably be better to make every one pay his 50 centavos and to replace the *prestación vial* by paid labour wherever practicable ; this would make it possible to engage labourers who could be provided with proper tools.

II. The topography of the country permits of only a very few of these wagon roads in the east, and in the elevated portions of the country beyond the high table-land. The most costly of the national roads, both as to construction and maintenance, are those which have been built by the Indians in the higher regions of the Andes exclusively for the use of beasts of burden. Numerous caravans of mules, llamas, and asses pass daily through these narrow and tortuous paths, traversing the yawning gorges on the flanks of the mountains, or skirting the precipices of the Cordillera ; bearing loads of coca, coffee, rubber, or minerals, according to the district. The inner trade of Bolivia, carried on in this manner and by means of Indians, is always interesting to the foreigner.

Bolivia contains very few bridges worthy of the name, but a few are fine examples of engineering ; as a rule, however, the rivers are forded ; the majority of the roads (the *herreradura* or mule-tracks) not only skirting the heights and traversing the valleys, but profiting by the ravines and the dry beds of watercourses or torrents, which thus provide economical highways. In some parts of Bolivia at all seasons, and in others at the rainy season, the rivers are crossed by means of a wire cable stretched from one side of the river to the other, on which runs a pulley or *oroya*, from which a basket, or sometimes a mere trapeze, is suspended. The traveller sits in the basket or on the suspended



THE ROAD TO MAPIRI.



DESCENDING THE RIO MAPIRI A BALSÁ.

seat, and hauls himself across, or is drawn to the other bank by means of a rope or a lasso.

During the rainy season the difficulties of crossing the rivers is such that timid travellers prefer to postpone their journeys until the dry season sets in. It must be remembered that during the rains one runs the risk of being checked by a torrent or a flooded stream for a period of time which depends on the severity of the spate. The Indians, to whom time is nothing, will not try to cross when there is any danger, and there are not always the means of improvising an *oroya*, which, after all, the traveller might hesitate to employ.

III. This is true only of the eastern portions of Bolivia and certain mountainous regions, for access to the principal cities of Bolivia, especially to those on the table-land plateau, is to-day easy enough. Others are accessible by means of diligences, known as *carreteras*. These diligences, which are to be found only on the few roads already mentioned, run regularly only for six months in the year (July to December). They cover an average of forty-five miles a day, and the mules are changed about every eighteen miles. On some routes they run every fourth day ; on others only every eighth day. They are usually followed by a cart or wagon, which carries the passengers' baggage.

During the dry season it is possible to travel by carriage on almost all the roads ; but one is subjected to a number of delays and annoyances, despite the provision of relays of mules and all possible precautions. Certain roads, like those from La Quiaca and Tupiza to Sucre, are theoretically open all the year round, but one cannot depend on them, owing to the frequency of flooded rivers and the bog-holes and swamps formed by the rains. On muleback one may travel in any weather, but not without certain discomforts. If the traveller is

obliged to make a long journey, he will do well to provide himself with a comfortable saddle, and, if he is fond of comfort and easy nights, with a small portable bedstead, with mattress and blankets, and also a supply of provisions, for outside the cities and comparatively large communities it is not prudent to count on any but the most primitive supplies and comforts. In all towns or villages it is easy to find muleteers or *arrieros* who will hire pack-mules ready for loading, and saddle-mules, either with or without saddles.

The cost per mule per diem or for the complete journey varies according to the price of forage and the difficulties of the route ; it is always best to insist on a quotation for the entire journey, remembering to leave the *arriero* the duty of feeding his mules, and to have a perfectly explicit understanding that he does so at his own cost. As a rule the traveller also pays for the *arriero's* mule, when the caravan is not organized as a common venture by a party of travellers following the same route, or by a trading company ; the muleteer's assistants always go on foot.

It is impossible to give any precise indications of the cost of such journeys. As a rule a private contract is concluded with the muleteer ; and the latter always demands an advance of half the price agreed upon. There is no objection to giving it him, for the muleteers are usually an honest body of men ; but it is just as well to take the precaution of going to the police-station with him, there to sign an agreement as to the price, and to obtain a guarantee on his mules for the sum received. As a rule we advise the traveller to hire mules rather than buy them, for the muleteers are careful only of their own belongings.

The muleteer is usually accompanied by an assistant and six mules. The cost of the food for

the men is not charged to the traveller, and unless he is setting out on an expedition of some importance he will not need more than one or two mules. The load of a pack-mule is 200 lb. of baggage or 264 lb. of miscellaneous merchandise. The baggage-mule has to follow the traveller at a comparatively rapid pace; the more heavily laden creature is subject only to the will of the muleteer in charge of a convoy of merchandise.

A seasoned traveller may count on covering forty-five miles a day if the roads are in fair condition; if unaccustomed to this mode of travel, he may find twenty-four to thirty miles as much as he can manage.

IV. On all the roads, whether carriage roads or mule-tracks, the day's journey ends at a posta, posting-station, or relay. These are Indian buildings of adobe or unbaked brick, usually the property of the nation, and consisting of one or two rooms and a corral or enclosure for the animals. These inns are lacking in comfort and usually in cleanliness; the travellers are huddled together in the one or two rooms available; and if the inn lies on a diligence route there will be two or three beds for their use. Those who fail to obtain a bed stretch themselves on the floor, which consists of the naked earth, or on a kind of earthen bench, about a yard in width, which runs round the room, and often forms its sole furniture. As a rule the traveller may expect to sleep on the hardened earth, wrapped in his travelling rugs, with a saddle or bag for pillow. One soon grows used to such a bed.

In these posting-stations, where the traveller enjoys without payment the use of the room which shelters him and the enclosure which protects his animals, one should always be able to obtain provisions for man and beast alike, as well as a change of mules, etc., but as a rule this is only the case

when the post-master is possessed of intelligence. Then, as well as shelter, for a modest payment one can obtain a meal, but it is imprudent to count on it, for in many localities nothing can be obtained, even bread and wine being often lacking. It does not do to be exacting, and one should fortify oneself with a good dose of philosophy, for the majority of these little difficulties are due simply to the ill-will of the inhabitants.

In this connection we must repeat that although the Bolivian of the upper and middle classes is extremely hospitable, the Indian, on the contrary, who is often the only inhabitant of the villages and the country-side, is the very reverse. He may possess fowls, kids, and sheep, but he will refuse to sell them, no matter at what price, and will deny, in the face of the plainest evidence, that he possesses the smallest living creature ; above all, he will pretend to understand less Spanish than he really knows. One has almost always to take by force such animals as one needs, although one is perfectly ready to offer good payment. This is frequently done, but the unaccustomed traveller shrinks from such tactics or dares not resort to them, and thereby exaggerates the difficulties of travel.

As to forage, it is usually to be found at the posting-stations, the price varying from 3 Bs. to 10 Bs. per 101 lb., barley, grain, and straw included.

V. The *postas*, or relay-stations, on the larger highways are not only intended to serve as inns for travellers ; they are more particularly supposed to find a change of mules when they do not possess the necessary animals, and in such a case the mules taken in the morning from one *posta* are left in the next, where they pass the night, their places being taken by other mules which have been rested. But these mules, which one has the right to demand upon payment, are not always to be obtained when

they are needed ; they are occupied in the public service, or are not fit to travel. One does better, therefore, not to count on them, but to hire animals from a transport company.

When the *postas* are really provided with mules the invariable tariff, fixed by the State, is 2 reales or 20 centavos per league per mule, and 1 reale for the postilion. The latter is indispensable to the traveller, particularly to point out the road and the fords of the rivers. These postilions are the wonder of all who see them at work. Their endurance is amazing ; always on foot, and always chewing their quids of coca, they follow, or rather precede, the traveller, whether the latter chooses to proceed at a walk, a trot, or a gallop. They are able to cover thirty, forty, and even sixty miles a day, despite the bad state of the roads and the stones of all shapes and sizes which they encounter at every step.

These Indians, who assist in the loading and unloading of the mules, and lead them back to their posts, are often enough treated with brutality by certain of the Bolivians, but it seemed better to us, and always proved so, to try the effect of a small gratuity ; a few pence will always obtain better results.

Besides the *postas*, there are in many of the villages *tambos*, inns of a sort, built, like the rest of the houses, of earth, and belonging to private owners, who will let the traveller a bare chamber for 80 centimes to 1 franc for the night ; and at these the traveller can obtain food on the understanding that he must not be too fastidious. The traveller should remember that it is almost always hot in the daytime, but that the nights are cold even in the eastern portions of Bolivia ; he will therefore do well to provide himself with rugs or blankets and a heavy cloak. Before setting out he should make sure that the day is not a *fête-day*, or the 24th of June, or

the 24th of December ; these are days on which the postilions change their posts ; and in the villages, on *fête*-days, all the inhabitants, men and women alike, are in a state of inebriety ; one hears nothing but the din of horns and drums, and one encounters the most obstinate ill-will.

The following table shows the distances between the various departmental capitals :—

| Capitals : | Potosi. | Tarija. | Santa Cruz. | Oruro. | La Paz. | Cochabamba. | Trinidad. |
|------------|---------|---------|-------------|--------|---------|-------------|-----------|
| Sucre ... | 74 | 248 | 215 | 191 | 324 | 169 | 872 miles |
| Potosi ... | — | 206 | 290 | 238 | 382 | 244 | 907 „ |
| Tarija ... | 206 | — | 544 | 383 | 589 | 418 | 680 „ |
| Santa Cruz | 290 | 544 | — | 388 | 542 | 277 | 654 „ |
| Oruro ... | 238 | 383 | 388 | — | 144 | 120 | 384 „ |
| La Paz ... | 382 | 589 | 542 | 144 | — | 265 | 528 „ |
| Cochabamba | 244 | 418 | 277 | 120 | 265 | — | 263 „ |

VI. In the north and north-east of Bolivia the transport of travellers and merchandise is effected by water. The Territory of Colonias, the department of El Beni, and a large part of that of Santa Cruz are placed in communication with the outer world and with the interior of Bolivia by means of their navigable rivers. The whole of this great surface of country is covered by a network of magnificent rivers, dependent upon the Amazonic system, the majority of which are navigable at all seasons, and nearly all their affluents at certain seasons.

Although it still leaves something to be desired, the river navigation of Bolivia is gradually undergoing development ; every day fresh rivers are opened to trade, and steamboats appear on waters hitherto navigated only by a few frail *pirogues*, made from hollowed tree-trunks, or rafts made by binding several trunks together. According to the statistics of the Oficina de Estadísticas y Estudios Geográficos, the total length of the navigable rivers of

Bolivia is no less than 11,669 miles. This sum is made up as follows :

| Rivers. | | Navigable from | To | | Length. |
|---|-----|----------------|----------------|-----|--------------|
| Paraguay | ... | Lake Uberaba | Rio Parana | ... | 1,116 miles |
| Itenez | ... | Puerto Montes | Rio Mamoré | ... | 1,054 " |
| Beni | ... | Rio Miguilla | Villa Bella | ... | 992 " |
| Pilcomayo | ... | Villa Montes | Rio Paraguay | ... | 992 " |
| Mamoré | ... | Chimoré | Guayramerim | ... | 806 " |
| Madre de Dios... | | Inambary | Rio Beni | ... | 744 " |
| Itonama | ... | San Pablo | Rio Itenez | ... | 620 " |
| Sara | ... | La Estrella | Rio Mamoré | ... | 558 " |
| Orton | ... | Tahuamanu | Rio Beni | ... | 496 " |
| Baures | ... | Rio Blanco | Rio Itenez | ... | 372 " |
| Inambary | ... | San Gavan | Rio M. de Dios | ... | 372 " |
| Paragua | ... | Florida | Itenez | ... | 310 " |
| Pirai | ... | Pirai | La Estrella | ... | 310 " |
| Chaparé | ... | Santa Rosa | Mamoré | ... | 248 " |
| Abuna | ... | Caramanu | Madera | ... | 248 " |
| Yacuma | ... | Santa Cruz | Mamoré | ... | 248 " |
| Ibaré | ... | Ibaré | Mamoré | ... | 217 " |
| Machupo | ... | San Pedro | Itenez | ... | 217 " |
| Desaguadero | ... | Titicaca | Poopo | ... | 199 " |
| Other rivers—Securé, Isiboro, Chimoré, Madeira, Madidi, | | | | | |
| Mapiro, San Miguel, Blanco, etc. | | ... | ... | ... | 1,550 " |
| Total | | | | | 11,669 miles |

Of this total some 6,000 miles are navigable by steamers of 4 to 6 feet draught ; in particular the Upper Purus, Acre, Orton, Madre de Dios, Beni, Madidi, Itenez, and Mamoré Rivers, with their respective tributaries.

On other rivers navigation has not reached its full development on account of difficulties encountered at certain points, such as rapids, locally called *cachuelas*, formed by rocks rising from the river bottom ; or *palizadas*, masses of tree-trunks entangled and obstructing the channel, especially when the rivers are low. When such obstacles are encountered it is necessary to unload the boat, carry the cargo past the obstacle along the bank, and

then load the boat once more and resume navigation. These obstacles necessitate the employment of vessels of various kinds and capacities peculiar to the Bolivian rivers and the higher tributaries of the Amazon.

When navigation is not open all the year round to steamers it is usually on account of such obstacles, which have not been removed because the necessity of employing all the natural means of communication has not yet been felt with sufficient force ; the population being very sparse and the area of the country very great.

At the present moment the situation has been modified by the construction of the Madeira-Mamoré railway, which circumvents the famous rapids of the Madeira, thus entirely changing the economic situation of a new country and giving a most necessary impulse to the navigation of these rivers. Rivers which can be utilized for long distances once their channels have been cleared or deepened are very numerous, and such methods merit more attention than they have as yet received. However, the Bolivian Government has given the question some attention and has awarded certain contracts for the dredging, cleansing, or damming of certain rivers. The establishment of means of transport and lines of navigation is at present an excellent means of investing money in Bolivia.

VII. Let us now take a rapid glance at the various hydrographic regions of the country, so that we may obtain some idea as to the conditions of navigability on the principal rivers.

Let us first of all take the western region, which includes the departments of La Paz and Oruro, with the Desaguadero and Lakes Titicaca and Poopo as navigable waters. The first of these is at all times navigable by steamers of 500 tons. On Lake Titicaca there is a daily service of steamers which touch

at the islands and the banks, while they also connect the trains from Guaqui with those from Puno. These steamers, which run up to 1,500 tons, are the property of the South of Peru Railway and Steamship Company. This fleet consists to-day of five steamers, the largest of which is the *Inca*, which, with the *Coya* and *Don Juan*, has come to supplement the old *Yavari* and *Yapura*, which we saw twelve years ago. These old steamers, which are still in use, were brought in sections from the coast before the railway from Mollendo to Puno was open to traffic. That was many years ago. Both lakes and rivers are also navigated by a multitude of various kinds of vessels, the most original of which are the Indian boats, which are entirely built of reeds, of which even their sails are woven.

The south-eastern region contains only the Paraguay, Pilcomayo, and Bermejo, the two latter being tributaries of the first. Only the Paraguay is navigable over its whole length ; it is the scene of a busy steamer traffic. The other two rivers are navigable in their Bolivian waters only by small boats. In the Argentine the Bermejo has been rendered navigable over more than 360 miles of its course. The Pilcomayo will shortly be navigable for at least an equal distance. The future will prove whether it can be rendered navigable in Bolivian territory.

VIII. The hydrographic region of Eastern Bolivia includes the Rio Mamoré and its affluents, of which the Chimoré, Chaparé, Isiboro, etc., are navigable by steamers or smaller vessels according to the season. On these rivers there are navigation companies which undertake the transport of travellers and merchandise by means of steam-launches.

On the Upper Paraguay, and Lakes Uberaba, Gaiba, and Mandioré, there is a constant navigation, and many rivers of this eastern region only need clearing of the tree trunks which block them to

allow boats to pass. In this region the most frequented route is that of the Rio Mamoré, which allows the transport of travellers and merchandise from Trinidad and Santa Cruz to Cochabamba and *vice versâ*. Travelling from this latter point the Rios Chaparé, Chimoré, and Isiboro are utilized, navigation being accomplished by means of rafts manned by Yuracare Indians, who are excellent boatmen, as far as the confluence of these rivers with the Mamoré, where steam navigation commences; but at present it is not very regular. In April the waters begin to fall, and attain their minimum in July.

The descent of the Mamoré is made without difficulty as far as Guayramerim, a point some 36 miles from Villa Bella, where the first rapids of this river are encountered. Before Villa Bella is reached there are four more. Between this point and Trinidad (445 miles) the cost of the journey varies from £8 to £9 sterling, the passage of the five rapids by means of special rafts being included. Descending, these prices are diminished by one-third, and merchandise pays 8 francs per arroba of 25 lb. From Villa Bella the traveller continues toward the Amazon by the Madeira, or he can ascend the Beni as far as Riberalta and Rurenabaque, if he wishes to return to La Paz.

The Itenez, the largest affluent of the Mamoré, with its course of 1,100 miles, navigable without difficulty at any season by vessels of light draught, is rarely threaded by a steamer, for the region it flows through is almost uninhabited.

The northern region, including the Territory of Colonias, the department of El Beni, and a portion of that of La Paz, is that in which the river navigation is most considerable, for it is in this region that the majority of the *barracas* are situated. These are the establishments installed on the



A BATELON ON THE RIO BENI.



A PORTAGE.

river banks by which the rubber of the region is collected. They are at the same time warehouses for the storing of rubber and stores containing the most varied merchandise. The *barracas* are often surrounded by plantations.

Despite their number and their importance, the rivers of this part of the country are subject to the common fate of all the higher affluents and sub-affluents of the Amazon—namely, a considerable diminution of their waters during the dry season, which renders the channels difficult and unreliable on account of the obstacles which accumulate at certain points. It is really only during the season of high water that steam navigation is easy and rapid ; in general, on the Rios Beni and Madre de Dios, the steamboats run freely from December to May. From June and July the steamers encounter increasing numbers of obstacles and are exposed to the risk of a sudden fall of water, when the types of vessel peculiar to each river come into use, particularly from August to November.

During the months of July and August navigation is inconvenient on account of the expanse of mud, which has not as yet had time to harden, but is left uncovered by the falling waters on either bank, making landing a difficult matter. The reefs uncovered at low water and the entanglements of tree trunks disappear with the rise of the waters, and the steamers recommence running.

Descending the rivers during high water, navigation is both easy and rapid, but it is also rather dangerous on account of the swiftness of the current. It is difficult to estimate the time needed to navigate this or that river, as the day's journey, ascending or descending, varies according to the river, the amount of water in it, the kind of vessel employed, the amount of cargo carried, and the crew which steers or propels the vessel.

IX. The vessels peculiar to the rivers of those regions which do not permit of steam navigation, and which are everywhere employed when the waters are low, are the *balsa* and the *callapo*, each a species of raft ; together with boats of various dimensions—*monterias* or *batelon*, *egariteas*, *canoas* or *pirogues*, the latter being dug-out canoes.

The *balsa* is a raft consisting of seven pieces or trunks of a peculiar and very light wood known as *palo de balsa* (raft-wood) ; these pieces are either bound together or pinned with stakes of *chonta*, a kind of black palm which is very hard. The fore part of the raft is narrowed slightly, and the trunks are arranged on a curve whose elevation is perhaps eighteen inches, so that the sides are higher than the middle. Each of the seven trunks is perhaps five inches in diameter. On the framework thus made is placed a platform of plaited bamboos, known as *chairo* ; this platform, which is intended for the reception of the cargo, and on which any passengers take their places, is called the *huaracha*. At each end of the raft a space of three to five feet is left free of any covering ; here sit or stand the three boatmen who form the crew—two at the bow and one at the stern. A good raft is usually twenty-two to twenty-six feet long, by five to six feet wide, and will carry about $7\frac{1}{2}$ cwt. of cargo, as well as the three boatmen.

A *callapo* or *monteria* consists of two or three *balsas* lashed together ; such a raft will carry as much as 34 cwt. The crews of these rafts, according to their dimensions, consist of three to fifteen men ; these men are Leco Indians, or Mosetenes, or Yuracares, who are highly skilled in this kind of navigation.

The pilot is the captain of the crew ; he is naturally the calmest and the most expert ; the *punteros*, who are stationed at the two ends, are

the strongest ; the rest are the rowers. The navigation of the *balsa* is terribly hard work when mounting against a current ; as a rule two men go ashore and tow the raft from the bank, pulling on a rope some fifteen yards in length ; a third, armed with a pole sixteen or eighteen feet long, keeps the raft a certain distance from the bank, so that it shall not run aground. Where the water is too shallow to float the raft, it must be dragged over the stones in the bed of the river. In reaches where it is impossible to make one's way along the bank the raft is poled up-stream, a method of progression which costs more effort and is less speedy.

The crew of a *balsa* or *monteria* will usually navigate for some ten or twelve hours a day, during which they will perhaps make nine or ten miles ; to rest, eat, or sleep they go ashore, which action is known as *encostar*.

X. The navigation of the Mapiri (one of those rivers which run into the Beni) must be made in *balsas* or *callapos* manned by Leco Indians. From Mapiri the descent is rapid as far as Huanay, and the only obstacles are a few sunken reefs, which cause dangerous vortices in the impetuous stream. Where the Mapiri takes the name of Kaka (river of rocks)—that is, at the confluence of the Coroico—there are many dangerous passages full of surface rocks. This river finally flows into the Beni.

The Rio Boopi also leads to the Beni ; rafts like those of the Mapiri are piloted by Mosetenes Indians. The passage is rapid, for at the outset the river enters a narrow gorge, that of the Meniqui, in which the current flows at a dizzy speed ; eventually the Beni is reached at Guachi. Rafts are employed as far as Rurenabaque and Salinas or Puerto Brais, as between the two ports there is the dangerous passage of the Altamirani, which is encumbered with rocks and rapids.

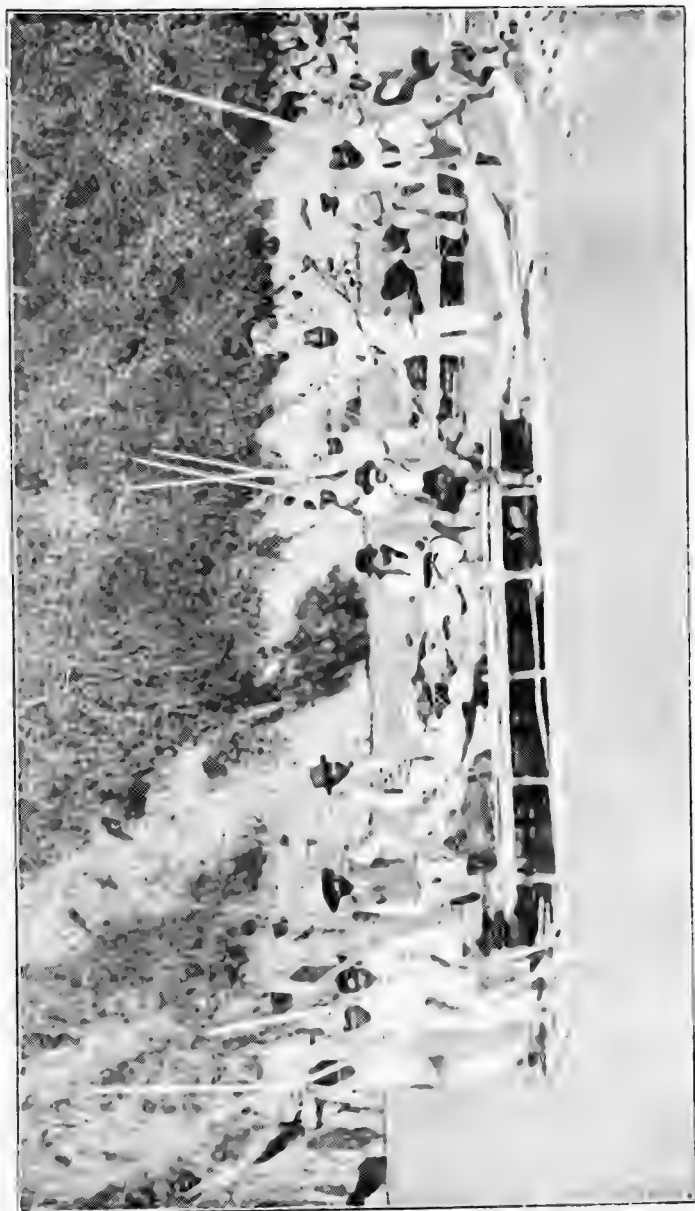
The Rio Beni is then freely navigable by large steamers as far as Riberalta, at the mouth of the Madre de Dios, a distance of 473 miles. Steamers cannot proceed to Villa Bella on account of the Esperanza rapids or falls, which are 340 yards long with a declivity of 18 feet ; the river here is nearly a thousand yards wide, and its depth is three fathoms. The current is so rapid that boats and rafts must be unloaded both ascending and descending. The railway now being built between Riberalta and Guayaramirim will circumvent this difficulty.

The Rio Madre de Dios, on the banks of which there are numerous settlements, is navigable for steamers during the months of high water from Riberalta as far as its remotest tributaries, such as the Inambari, the Manu, the Tambopata or Pando, etc. ; during the rest of the year the journey must be made in *callapos*. The navigation of this river is difficult only about the middle of its course, where there are two rapids, which are, however, completely covered when the water is high. The Madre de Dios is navigable by its affluents as far as the out-lying spurs of the Andes.

To pass from this river to the Rio Acre there is a choice of two routes. One may go overland from the Carmen *barraca* to Cobija, or by water, by way of the Rios Manuripi and Tahuamanu, affluents of the Orton. The Orton, an affluent of the Beni, is, like the Madre de Dios, navigated by steam-launches during the season of high water, and by other vessels—rafts and canoes—all the year. Numerous *barracas* (rubber stations) lie along the Orton, whence one can easily pass to the Rio Acre.

We need not speak here of the navigation of the great Madeira River, which flows through Brazilian territory.¹ Nearly two hundred miles of its course is obstructed by extremely dangerous rapids ; but

¹ See *Au Brésil du Rio Sao Francisco à l'Amazone*, ch. xv., p. 424.



A CALLAPO

these are to-day evaded by the railway, whose head lies at San Antonio, a river port, where in 1910 we saw Transatlantic vessels of 6,000 tons.¹

As for the other Bolivian rivers, all more or less utilized at the present time, they offer no special peculiarities, being navigable by light-draught steamers or by raft, according to the season.

XI. Although travel in the interior of Bolivia, and especially in the eastern regions, is still full of surprises, it is easy to exaggerate its difficulties and dangers. Everything is a question of determination and patience. These regions, which are the hope of Bolivia, are, unfortunately, too little frequented by Europeans; the high table-land, with its mineral treasures, satisfies their ambition for the moment. To taste the joys of exploration one must go to such countries as these; but progress is so sudden and so rapid an affair that the railway will soon spoil them for the greater good of trade and civilization and to the detriment of the picturesque. In all our travels in the various great States of South America we have noted the same thing; the keen edge of our impressions has gradually been dulled as new methods of transport were introduced into regions formerly traversed only with difficulty and at the cost of time. These difficulties one comes to regret in after-days, as one regrets the vanished years, but without too great a bitterness.

In the whole of the mountainous region of the eastern slope of the Andes the watercourses are the only highways. When there is water in them the traveller descends them in a boat or on a raft; when they are dry he marches along their banks or in their beds. The course of a stream is followed as long as it leads in the desired direction; then it is left for another. Men live on the rivers as in

¹ (During the construction of the railway, vessels of 10,000 tons made the voyage to San Antonio.—Tr.)

Europe a modern traveller lives on the railway. It is sometimes a difficult mode of progress, but it is highly picturesque, often pleasant, and full of incidents which enrich the memory.

On land, unless one is an Indian, one is always on the back of a mule ; an indifferent-looking, docile creature, solid and sure-footed ; seated firmly in a saddle which is not much to look at, but which forms a fairly comfortable seat. Indians follow or precede one on foot, carrying baggage and provisions, or driving the mules or asses which carry them, according to the locality and the size of the caravan. Thus one goes from village to village, if there are any villages on the route, or from hacienda to hacienda, or from posta to tambo. The trail usually consists of a sandy river-bed, sprinkled with rocks and pebbles, more or less insecurely fixed, which roll and twist under the feet and now and then give one a tumble into some puddle remaining from the last flood. Other paths are trails through forests, or across precipitous rocks, or through more or less uneven plains ; mere paths, narrow, steep, muddy, encumbered with rocks or trees. Sometimes one has to cross the torrent because the trail goes that way. If the water is in its normal condition, so much the better ; the worst that can happen is that one may wet one's legs ; but if it is full, and up to the mule's belly, it is sometimes preferable to cross on foot, using a strong stick to prop oneself against the current ; but with four or five feet of furious water, it is useless to think of crossing, as the prudent Indians would not follow, as happened to us in our previous journeys. Then there is nothing for it but to wait on the bank till the river pleases to go down, which usually happens in two or three days at most. To go back would as a rule be useless, since the last torrent crossed will usually be in the same condition as its neighbour.

The only thing about these journeys that is really rather insupportable is the length of time taken by certain journeys. Nothing could be more irritating than the constant forced halts which are often necessary in the rainy season ; at such times, too, one has often to leave the trail and force one's way through a tangle of roots and trunks in order to avoid foundering in mud-holes ; or fallen trees lie across the path, and must be circumvented. At such times one is fortunate to make as much as fifteen miles a day.

XII. But when the rains are over such a journey can be delightful. In the lower Cordillera especially, the trail is often so beautiful that all the difficulties of travel are forgotten, as the winter is forgotten in the May sunshine. The country is splendid, fresh and fragrant, rustling with the leafage of an eternal spring. Behind one lie the mountains, ranged high against the infinite, with their jagged peaks, their snows, their glaciers, which fill the remoter horizon. Before one and on either hand the forest reigns almost uninterrupted ; its aspects, its vegetation, and its animal life are infinitely various. The eye is certain always of encountering some new beauty, some new sensation. On the trees which line the banks of the streams a world of strange blossoms hang like temptations from the drooping lianas.

In the evening a halt is made, for one must not travel during the night. Now and again, by good fortune, the halting-place is near some farm or village, where one is welcomed with open arms if it holds a white man or half-breed of any cultivation ; with more or less animation even if they are Indians. As one journeys farther from civilization one is well content with any kind of shelter, so that one can sleep and eat, well or ill, according to the contents of one's packs and one's own *savoir-faire*.

The traveller to whom the country is already familiar halts where he wills ; the halting-place will always be beautiful ; the camp will be pitched on some lovely spot with water, fish, and game all at hand. On reaching the spot selected, or on selecting one at will, the camp is made ; in a few minutes the Indians have built primitive shelters and gathered wood for the night. While they are busied thus the traveller takes his line or his gun, and if the camp is on the bank of a river his hunting or fishing is soon successful. Soon the victims are roasted to a turn, and each helps himself at will. If the traveller is a good master and has a demijohn of *tafia* in his baggage, and is given to sharing it at opportune moments, the camp is gay indeed. Dinner once over, each Indian squats round the fire on his heels, as his fashion is, incessantly relighting an eternal cigarette or chewing a quid of coca.

At the first fall of night the various representatives of the local fauna come down to the river, at no great distance, to drink their fill ; sometimes a jaguar or puma, too prudent to be formidable, will surprise his drowsy victim by the bank. As the darkness grows deeper the silence of the forest is broken by the sound of flight, by sudden rustlings, or by a strident shriek. Immediately the creatures of the forest raise their various cries ; the uproar lasts for a moment, and all relapses into a silence in which one still hears, more or less sensibly, the murmur of a million insects.

At first, in spite of fatigue, one woos sleep vainly. But after a few days one pays no attention to all this clamour, and one's rest is hardly broken by the sound of rain or a sudden thunderstorm.

Presently nothing will remain to us but the memory of these fair, solitary nights ; of the strange voices of the forest and its majestic silences ; of this nocturnal poetry of the wilderness. These

poignant sensations of strangeness and delight will be sadly mitigated for the travellers of to-morrow, who will see and hear the locomotive make its way beneath the forest trees, and the steamer breasting the current of the rivers. Do not regret it overmuch ; it is the price of progress, and all the world will be the gainer.

CHAPTER XVI

THE RUBBER DISTRICTS. THE TERRITORY OF COLONIAS, ETC.

I. The northern and north-western Territories of Bolivia. Their wealth.—II. Routes. Picturesque journeys ; lack of population.—III. Climate of the Territory of Colonias ; rains and floods.—IV. Hygienic hints.—V. The four districts of the Territory and their rubber stations.—VI. The rubber forests of Bolivia and their outlet.—VII. Bolivian rubber. Its increased production. Table of exports.—VIII. The rubber-collector. The conditions of his life. The indifference exhibited in respect of the lesser alimentary crops, and their real advantages.—IX. The native labourer, the *mozo* ; how he is exploited ; measures of protection.—X. Transport of rubber. Roads. What should be done.—XI. Amazonian rubber and the competition of Asiatic rubber. Plantations and their advantages.—XII. Protection as a measure directed against the competition of Oriental, Brazilian, and Peruvian rubber.—XIII. How to protect the Bolivian industry. The beneficent effect of the Madeira-Mamoré Railway. The abrogation of the land law of 1905.

I. BOLIVIA possesses considerable territories lying to the north and north-west of the department of La Paz and to the west of that of El Beni, which are known as the Territory of Colonias. This region was in 1890 constituted a Delegation, known as the Delegation of the Madre de Dios and the Purus, but the greater part, if not the whole of this territory, which then comprised more than 154,000 square miles, was claimed by Peru. The frontier of Peru and Bolivia has been the object of a number of treaties since

1821, but has never been definitely determined. The claims of Peru grew all the more pressing as these territories, originally regarded as of little value, became known as being in fact immensely wealthy, for enormous quantities of rubber have been discovered along the banks of the Rios Purus, Acre, Madre de Dios, etc. These territories, which were hardly given a thought formerly, were inhabited only by tribes of Indians, whose numbers and importance are still unknown (nearly the whole of the western portion being entirely unexplored), but some of whom are absolutely savage. By the treaty of 1903 Brazil acquired the Territory of Acre, containing 118,000 square miles, and in 1909 an arbitration judgment pronounced by Argentina gave Peru an area of some 115,000 square miles. The present area of the Territory of Colonias is 81,600 square miles.

The wealth of this region was reported by the American traveller Heath, who explored it in 1879 amid the greatest dangers. Since then rubber stations have been established on the banks of most of the rivers of the region, which send their products to Europe by way of the Amazon and Para, until lately braving the most extraordinary difficulties in order to do so.¹

The aspect of the Territory is much that of El Beni for the most part ; plains covered with forests, mountains to the south and west, an infinity of undu-

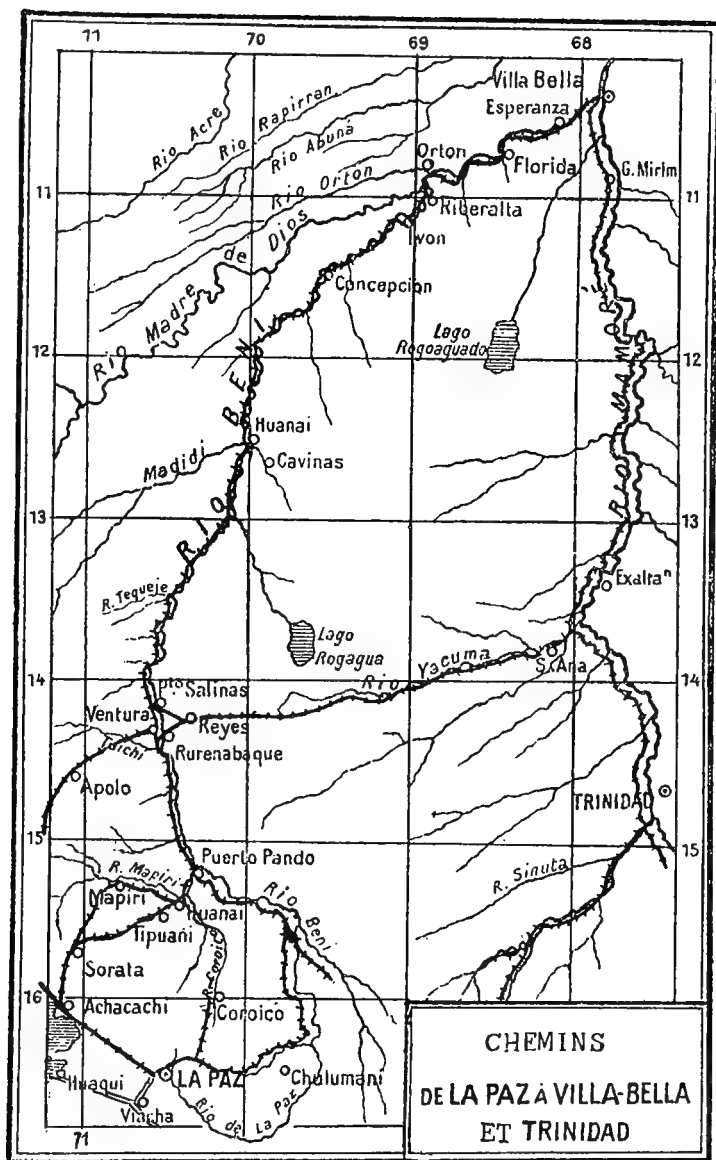
¹ The transport of goods from the centre of the Beni to the port of embarkation for Europe—San Antonio—required forty days before the construction of the Madeira Railway, on account of the rocks or reefs, forming falls 20 to 30 feet in height, which obstruct the whole width of the Madeira, and force the crews of transport canoes to carry both boats and cargo over long portages. The ascent was especially laborious, as the boats had to be towed against the stream. The cost of transport was 4 francs per *arroba* for the descent, and 7 francs for the ascent. The losses due to accident are on an average 5 per cent., and insurance companies will not insure goods destined for El Beni. (The *arroba* = 25·3 lb.)

lations and depressions, sometimes abrupt, sometimes slight, threaded by numerous fluvial arteries, in which the current is usually sluggish, especially during the dry season. This region, like the Territory of Acre, which we have on two occasions explored, has not yet attained to a state of complete maturity ; it is for the most part a land still in process of formation, and for ages yet its chemical and physical elements will continue to act and react on one another. The predominant formation is an alluvial deposit of clay and sand, interspersed with reefs of rocks of varying depths ; and the less permeable portions are the temporary or permanent resting-place of large quantities of water, which, with the organic detritus of the forests, leads at certain seasons to the development of a vitiated atmosphere which is enervating and unhealthy. During the winter the evaporation from these impermeable tracts is intense, but even then they are highly productive, displaying a varied and luxuriant flora.

II. There are a number of roads, all very bad, by which the traveller can reach the Territory from La Paz. Riberalta, the usual objective and the provisional seat of the Delegation, is built on the right bank of the Rio Beni. The shortest route thither is that from La Paz to Puerto Pando by way of Canaviri and Coroico ; its length is 203 miles. From Puerto Pando to Rurenabaque is 155 miles by river and 60 by land. From Rurenabaque to Riberalta is 573 miles by steamer.¹

A second way, 254 miles in length (as far as Puerto Pando), utilizes the rivers La Paz and Boopi. The Mapiri-Huanay route is 312 miles, and the

¹ The Delegation communicates once every fortnight with the authorities at La Paz. These communications are effected by way of Puerto Palmira, thence by steamer along the Mamoré as far as Trinidad, and then by boat to Santa Rosa on the Chaparé ; finally, overland to Cochabamba, Oruro, and La Paz. This is the quickest route ; next comes the Mapiri-Huanay route.



Apolo-Consata-Sorata route 440 miles in length. The Puerto Brais railway will reduce all these distances, and, above all, the difficulties of the journey and the time required for it.

Although difficult, the route is extremely picturesque. Hardly has one crossed the Cordillera when on all sides, on the flanks of the mountains, far off on the plains, in the valleys, the vast virgin forests show as great sombre patches emerging from fields of verdure. Varied as the vegetation which composes them, some seem impenetrable, their huge trees garlanded with lianas and loaded with innumerable parasites. These trees are not of great diameter because, being huddled so closely together, they struggle upward to seek the air and the light.

Others, undulating in the wind, waving their palmated crests, seem like the parks of some destroyed Eden ; they are often so burdened with flowers that when the wind blows it is as though the snow were falling. Some of these forests are incessantly alive with myriads of splendidly coloured birds and monkeys of every species ; others, on the contrary, are so full of silence and shadow and mysterious solitude that the traveller might believe himself in a virgin world.

Everywhere innumerable watercourses drain the country ; some contain flakes of gold, but the true wealth of the country is in its vegetation, so marvellously vigorous and varied that even in America the forests of the Amazonian basin are proverbial.

Although this region lies wholly within the tropics, it contains every plant and animal to be found under the sun—from the cedar to the banana with its velvet leaves, which never thrives but under the Equator ; from the jaguar to the heat-loving monkey gambolling in the sun, and even, in the great plains of the east, from the shepherd watching his flocks to the collector of rubber and the planter of cocoa estab-

lished beside the rivers or in the depths of the odorous valleys.

Despite these natural advantages, the greatest to be found on earth, civilized man inhabits this region only at rare and isolated points. This portion of Bolivia is still a wilderness almost unknown, into which the Bolivians of the high plateau, attracted and held by the metalliferous strata from which they strive to tear their treasure, only come by chance to tempt fortune by the exploitation of rubber. As men are everywhere prone to generalize, the Territory of Colonias has the reputation of being full of mosquitoes, Indians, and wild beasts, each category more dangerous than the other. There is a manifest exaggeration here. Certainly the mosquitoes are an objectionable race, but they are not found everywhere, and as for the Indians, if they have on occasion displayed a certain malevolence—possibly justified, but of which they themselves are always the first victims—they are as a rule invaluable as boatmen and collectors of rubber, and it is regrettable that they are not more numerous. Remain the dangerous wild beasts: well, they fear man far more than he fears them, and moreover they speedily desert such localities as man inhabits or frequents.

III. The climate of the Territory of Colonias varies according to the proximity of the chain of the Andes, the altitude, the abundance of watercourses, and the direction of the winds. The temperature in May, June, and July is mild and agreeable, moderately cool in the morning and evening, varying between 53.6° and 76.6° from 6 p.m. to 6 a.m., and from 76.6° to 89.6° between 10 a.m. and 4 p.m. during the hottest months (September to December). Rarely does the thermometer rise or fall above these extremes. The normal temperature does, however, suffer a sudden fall when the cold south winds blow that are known as *surazos*; they come in September

and produce violent storms with great and almost daily variations in the temperature, which may give rise to affections of the lungs and throat as the sequel to sudden chills. The force and direction of the winds contribute greatly to modify the salubrity of any region ; places reputed to be unhealthy have become notably healthy when the forest has been opened or closed in a given direction.

The great defect of the climate here is the abundance of the rains. They fall continually through the whole rainy season, which lasts from December to May. The vapours of the Atlantic are brought up by the east winds, which are prevalent at this season ; on reaching the Cordillera they are chilled as the air expands and loses heat with its increasing altitude ; then the vapours condense and fall in torrents of rain, which often lasts for whole days together. But these rains are never cold, so they are not unpleasant as such rains would be in Europe ; one braves them without thinking anything of it, as in Europe one braves a summer shower.

When it does not rain (the dry season lasts from June to November) the climate is delightful ; the middle of the day is hot, with a somewhat heavy heat, although the sky is usually covered with a diaphanous mist which tempers the rays of the sun.

Floods are caused not only by rains in the western mountain regions, but also by local rains. They are dependent on the slope of the surface and the insignificant fall of the rivers. When the larger rivers are full the tributaries rise because their waters are dammed up or even flow backwards. The waters then become stagnant in every sense of the word, and decompose rapidly through the action of the heat and the vegetable and other detritus which they contain ; at such times they produce paludian fevers ; principally in April and May, when the waters begin to fall and the larger rivers receive the supplies of stag-

nant waters released from their tributaries. As the fall continues the mud left uncovered on the banks becomes an additional cause of fevers.

These paludian fevers, which are prevalent more especially during the rainy season, attack more particularly the rubber collectors—an ignorant and primitive population who know nothing of the most elementary rules of hygiene. Careless or imprudent whites pay the same penalty.

The lack of medical attendance, intemperance, negligence which results in the drinking of stagnant water drawn from pools or swamps or from the river banks ; above all, the bites of the mosquito, against which no protection is employed, and which convey malaria to healthy but debilitated persons : these are the causes of the ravages occasioned by paludism in this region, as throughout the Amazonic basin.

These conditions do not obtain throughout the Territory ; there are numerous healthy localities as, for example, along the middle reaches of the Madre de Dios, in all parts which lie at any altitude, and in regions not subject to floods where a portion of the forest has been cleared in order to give the beneficent breezes a free course. On the other hand, and we speak from long personal experience, any healthy individual of robust or even average constitution can maintain himself in good health, suffering, in the long run, from nothing worse than a little anæmia, by observing the following rules :—

IV. Do not drink stagnant water unless it has been boiled ; if one must drink unboiled water take it from the river, not from the bank, but from the middle of the current ; do not walk or ride or exert yourself in the morning fasting ; cover the loins with a belt of wool or flannel ; take short but frequent baths or douches in order to facilitate perspiration and to avoid congestion of the pores ; and in fever belts, or during the rainy season, take daily, as a preventive,

four to eight grains of sulphate or hydrochlorate of quinine (in a cachet or compressed in tabloids) as well as a few granules of arsenic ; finally, keep to an abundant and nourishing diet, and do not forget that the nights being cool it is indispensable to take warm clothing and good blankets ; and, most important of all, never omit the protection of mosquito-nets.

V. Such is the Territory of Colonias and the greater portion of El Beni, a land of magnificent vegetation ; it is regarded, not without reason, as a country where tropical agriculture may have a future before it. At present this vast country possesses a population of only some 40,000 to 45,000 inhabitants, without counting its 15,000 to 18,000 wild Indians, a population of which the greater portion if not the whole is occupied in the production and transport of rubber, the chief product of the Territory and the neighbouring countries.

This vast and almost unexplored country has since 1905 been placed under the administration of a *Delegado nacional* (national delegate) whose attributions are those of a prefect ; but his powers are more extensive on account of the distance between his administration and the central authorities. There is also a sub-delegate, a secretary, and four intendants or sub-prefects, who are in charge of the four districts into which the Territory is divided. These districts are the following :

The district of Rio Beni (12,358 square miles in area) includes the Rio Beni from the line of the Madidi¹ to the confluence of the Madre de Dios ; it stretches to the west as far as the first *barracas* in touch with the Rio Sena. Along the course of the Upper Beni there are twenty-two *barracas*, which are the only settlements in all this region.²

¹ A river explored by the French engineer Felix Muller ; he was killed there by the Indians in 1893.

² Throughout the basin of the Amazon the word *barraca* signifies

The district of the Madre de Dios has an area of 11,935 square miles ; it includes the river of that name and its affluents, and runs northward as far as Manuripi and the boundary line of the Orton *barracas*. The only centres of population are thirty-six *barracas*, of which two are military posts, on the banks of the Madre de Dios, and five on the Tambo-pata. There are *barracas* which contain several hundreds of workers.

The district of the Rio Acre embraces an area of 9,201 square miles, comprising the Rio Acre, on which there are twenty-eight *barracas* ; the Tahuamanu with twenty *barracas* ; the Manuripi with sixteen *barracas*, the Buyuyumanu with four *barracas*, which, with nine establishments installed on other rivers, gives a total of eighty-four *barracas*. Cobija, or Bahia, situated near the little Rio Cobija, on the right bank of the Rio Acre, and the frontier of Brazil, is the administrative centre of this wealthy district and the largest centre of population. It is a military post and customs station, and is rapidly progressing. Its fiscal revenues were estimated in 1911 at £49,600, but actually amounted to £72,444.

The district of Orton covers an area of 16,555 square miles, and includes the Rios Orton, Abuna, and Rapiirran ; it stretches eastward as far as the Lower Beni and the Madre de Dios. It contains forty-eight *barracas*, established at different points on these rivers. Villa Rica, a customs station and military post, is situated at the confluence of the

a rubber concession or exploitation of variable dimensions ; it also signifies the houses and plantations, or the *estradas*, which are systems of paths giving access to one or two hundred rubber-trees, the settlements or *puestos* inhabited by collectors *habilitados*, that is, equipped, by their employer, and the *barracon* or warehouse, and the office or manager's house from which the property is administered. One must not confuse the *barraca* with the *barracon*, which is the administrative centre of the exploitation.



A CARGO OF RUBBER.



PORTERS CARRYING RUBBER.

To face p. 278.

Abuna and the Madeira, on the Brazilian frontier. The revenues of this post, estimated at £8,000 for 1911, were actually £19,284.

There are many other rubber exploitations, among others those on the right bank of the Rio Beni, but these belong politically to the department of that name, which is also rich in rubber and a great producing region.

VI. On the markets of Europe Bolivia is not credited with the importance that she really possesses as a productive country, as her exports of rubber are always confounded with those of Brazil and Peru, being classed as Para or Mollendo rubber, according to their port of lading ; yet Bolivia is perhaps the greatest rubber-producing country in South America after Brazil. The exploitation of rubber is one of her principal resources, and after the mining industry it is the leading industry of the country.

The immense region known as the Territory of Colonias, although the richest in rubber, is not the only part of Bolivia in which indiarubber-trees occur : *i.e.*, the *hevea*, or *Siphonia elastica*, and the *caucho*, or *Castilloa elastica*—to mention only the principal species which yield the gum ; they are found in several other departments of the Republic. The rubber-producing regions of Bolivia may be divided into four zones, according to the customs posts which give the product outlet.

The first of these is that neighbouring on the Territory of Acre, now ceded to Brazil, whose product finds an official outlet in the river port of Cobija. The second comprises the greater part of the Territory of Colonias in the north-west ; numerous *bar-racas* are established on the banks of the principal streams of this region, which exports its products through the national custom-house of Villa Bella, situated where the Beni and Mamoré come together to form the Madeira ; by the less important post of

Villa Rica, on the Abuna, and by several lesser posts established on different rivers.

The third zone contains the rubber-producing forests of the department of La Paz, that is, several districts of the provinces of Larecaja, in which there are thirty-five large properties, Caupolican with twenty, Muñecas with nine, and the Yungas, North and South, with three and two respectively. The yield of this zone, monopolized largely by five large Sorata firms, is exported by the customs posts of Guaqui and Puerto Perez, on Lake Titicaca, on its way to the Mollendo railway.

The fourth zone includes considerable tracts of forest in the provinces of Vaca Diez, Yacuma, and Itenez in the department of El Beni, all the northern portion of the great province of Velasco, and a portion of that of Chiquitos, in the department of Santa Cruz, bordering on Matto Grosso, in which there are 29 concessions, containing nearly 20,000 estradas, but the greater part of this region is almost unexplored and unexploited by reason of the lack of labour. The fourth zone includes the Capare district, in the department of Cochabamba, where, besides the heveas, great quantities have been discovered of manicoba-trees (*Manihot Glaziovii*), euphorbiaceæ, producing what is known as Ceara rubber, the trees being perhaps 45 feet in height but very slender; a species that produces a good quality of rubber. The manicoba is comparatively easy to cultivate, as it grows in dry soils, although it develops more rapidly in damp localities.

It might well be cultivated in the hilly regions and on the banks of all the larger watercourses of the provinces of the Yungas, Larecaja, Caupolican, Muñecas, Inquisivi, etc., in the department of La Paz.

The rubber of the northern portion of El Beni finds its outlet through Guayramerin and Villa Bella, but that of the northern and eastern portions of

Santa Cruz, where the establishments installed on the banks of the Rios Paragua, Itenez, Itonama, and Verde gave a yield of about two hundred tons, is exported through the custom-houses of Puerto Suarez, Yacuiba, Oruro, and Antofagasta. The means of transport utilized are boats or rafts as far as a point known as Monte Cristo on the Rio Paragua ; thence in carts or on pack-mules to San José de Chiquitos, and thence to Puerto Suarez. The Itenez rubber goes down the Itonama or San Miguel as far as Recreo, and then follows the same route as the Santa Cruz cargoes.

VII. The rubber produced in the regions already detailed is that known as "fine Para," the extract of the latex of the hevea ; *sernamby*, a rubber of second quality, is made of bark and the residue remaining after the preparation of the finer kind ; while *caucho* is the product of the latex of the *Castilloa elastica*. This latter tree, which is very largely exploited in the Peruvian and Brazilian portions of the Amazonian basin, exists in large quantities in many parts of El Beni and the Territory of Colonias. According to the methods actually in use the tree is destroyed. As the *caucho* is far less valuable than the fine Para rubber, the exploitation of the Castilloa has not yet been undertaken on a large scale, by reason of the lack of labourers and inexpensive means of transport.

The following table shows the progressive increase in the exportation of rubber from Bolivia since the year 1905 :

| Year. | | Pounds. | Value. £ | Duty collected. £ |
|-------|-----|-----------|-------------|----------------------|
| 1905 | ... | 3,230,112 | 587,293 | 47,778 |
| 1906 | ... | 4,245,137 | 849,028 | 54,747 |
| 1907 | ... | 4,027,128 | 707,310 | 52,309 |
| 1908 | ... | 5,734,500 | 902,923 | 41,075 |
| 1909 | ... | 6,715,396 | 1,755,771 | 111,628 |
| 1910 | ... | 6,858,410 | 2,212,284 | 144,571 |
| 1911 | ... | 8,020,212 | 1,513,695 | 128,009 |

Between 1906 and 1910 the department of El Beni produced 15,166,800 lb. of rubber ; the Territory of the Colonias, 6,501,000 lb. ; the department of La Paz, 3,572,000 lb. ; and the department of Santa Cruz, 2,338,600 lb. In 1911 the rubber exported from the Territory of Colonias alone amounted to 2,217,000 lb. of fine rubber, 387,200 lb. of *sernamby*, and 1,012,000 lb. of second-grade rubber, the whole being valued at £131,486.

The export duties imposed upon rubber are 8 and 10 per cent. ad valorem.

The total production of Bolivian rubber may be estimated as something like 7,700,000 lb. annually ; but this is only an approximation, for owing to the enormous size of the country exploited and the distances involved, and the fact that most of the rubber zones are near the frontiers of neighbouring States, it is impossible to establish a satisfactory customs service.

The rubber of the rivers forming the Rio Abuna and the majority of the streams of the region monopolized by Brazilian firms, as well as the product of many other localities, is easily sent into Brazil and exported as a Brazilian product. This is due to the fact that there is no Brazilian consul except in the largest customs posts, and the owners of *barracas* are required to send a boat to the nearest consulate ; a matter which is often so difficult and productive of such delay that the exporters prefer to evade it by despatching their rubber as Brazilian, in spite of the Brazilian export rights, which are much higher than the Bolivian.¹

VIII. The different species of rubber-producing

¹ The export duties imposed by the Governments of the States of Para and Amazonas amount to 20 and 24 per cent. ad valorem. In 1913, by an agreement concluded between the Federal Government and that of the State of Para, these duties were diminished by 50 per cent.

trees and the methods employed to extract and coagulate the latex have been dealt with by many writers. Here we will give rather certain details as to the conditions of rubber exploitation in Bolivia, the conditions of life on the concessions, the existing means of communication, and will briefly glance at the possible effect on the Bolivian rubber trade of the future competition of Asiatic rubbers.

For many years the rubber industry has greatly prospered, with, of course, various vicissitudes due to the rise and fall of the market prices of the product ; but at the present moment it is suffering from a certain check from the high cost of production, due to the dearness and scarcity of labourers, the cost of living, and the heavy expenses of transport. The *seringueiro*, or extractor and coagulator, the principal factor of progress in rubber districts, can be established and maintained on the *barracos* only at a great expense ; and the mortality is very high among these ignorant people, who are ill-fed, intemperate, and contemptuous of every known rule of hygiene, which in these often unhealthy regions is a very serious matter.

Whether he be Bolivian, Brazilian, or Peruvian, the conditions of life and the methods of work of the *seringueiro* are the same : respectively painful and rudimentary. More often than not he arrives indebted to the amount of his fare and other travelling expenses ; he then receives on credit a hammock, a sack containing a few articles of cotton clothing, a rifle, a heavy knife, two baskets of manioc flour (each containing 66 lb.), 33 lb. of *charque* or dried meat, a sack of salt (66 lb.), a gross of boxes of matches, petroleum, sugar, coffee, haricot beans, a few boxes of tinned foods, and the necessary utensils for the extraction and manufacture of the rubber.

His life is ordered thus : At four in the morning he leaves his hammock, rapidly swallows a cup of

coffee, and at once takes the path leading to the heveas. He notes the reaction of the trees after puncture ; he makes gashes in their bark, and places under these his little cups or *tijelinas* ; returning to his cabin, he furnishes himself with a bucket, and then returns along the same path, which follows the most capricious zigzags ; and on this round he collects the latex of each of the 100 or 150 trees which make the *estrada*. Returning to his hut about one o'clock in the afternoon, he proceeds without loss of time to the fumigation or coagulation of the latex, an operation which involves one or two hours' labour in the midst of a dense cloud of smoke. This task completed, he prepares a meal, which usually consists of tinned meat or other inferior provisions, often spoiled by the damp. On the following day he recommences the same labour, and so on indefinitely, with barely the leisure to nurse himself through the attacks of fever which he may contract.

He might well give a few hours of the afternoon to agriculture, but as a rule he does not care even to raise crops for his own use. An hour of continuous work daily in the neighbourhood of his hut would solve or at least greatly diminish the food problem. But the *seringueiro* alleges, in addition to the fact that he has no seeds, that he is exposed to the risk of being changed from one *estrada* to another without being compensated for any improvements he may have made ; hence the indifference and lack of confidence which he displays. As for the employer, he would not have the *seringueiro* spare as much as a single day from his labours ; firstly because he might diminish the production of rubber, and secondly because he would certainly lessen the enormous profits which the employer realizes on the sale of preserved meats and other imported food-stuffs.¹ In remote

¹ It is only just to say that many steady *seringueiros*, men who do not obtain advances and decamp, encounter intelligent and humane employers who enable them to save and become independent.

estradas the prudent *seringueiro*, if he has any hope of remaining in one spot, will eagerly build his cabin, and, on the land which he has cleared to prevent the fall of trees upon his house, he will plant a few banana-trees, and sometimes manioc. If he lives on the bank of a river he will possibly take advantage of the season of low water, and in the alluvial deposit of the river bank he will sow haricots, broad beans, rice, potatoes, water-melons, etc., which will yield poor but extremely rapid crops. The less indolent will fish and hunt in order to obtain a welcome and beneficial substitute for the plate of beans and canned meat. In September, October, and November the food supply on certain rivers gives out, or if any provisions are left they are often spoiled by the excessive heat and damp.¹

At this time of year, the navigation being difficult, if not impossible, the *seringueiro* will go hunting more frequently ; and the silence of the endless forests is disturbed by the occasional report of his gun. In general he is a great amateur of fête days and very extravagant ; he spends largely on drink and futilities—not of his money, but of the interested credit which is allowed him. It matters little to him that he is charged 64s. for a box of cartridges, so long as his Winchester, besides serving him as a weapon of the chase and of personal defence, can be employed in a kind of wireless telegraphy, in the giving of ceremonial salutes, and will also serve as judge in the settlement of disputes.

IX. We are speaking here of the white or half-breed of Bolivian, Brazilian, or Peruvian blood. Far more melancholy is the condition of the native Indian

¹ During the summer nights the air is so charged with moisture that in the forests the water may be heard trickling as though it rained. All cereals are spoiled at the end of two months unless they are kept in glass or earthenware receptacles and hermetically sealed with wax.

worker, the *mozo*, as he is locally designated, who, owing to the dearth of labourers, is recruited by labour-agents from among the civilized Indians of Santa Cruz, which is in this way undergoing depopulation. In the distant regions of the Bolivian North-West the relations between capital and labour (more especially Indian labour) are by no means based on principles of justice and liberty, and the guarantees of the native labourers are illusory. Distinguished men who are to-day members of the Government and who have visited the rubber country have recognized the fact and brought it to the notice of Congress ; they have stated that on certain concessions the *mozo*, the peon, was simply a slave whom the master could retain in his service indefinitely on the pretext of more or less imaginary debts, and that he could even be disposed of to other employers by sale or exchange. This condition of affairs, which is contrary to the real interests of the employers themselves, has been condemned by the Government, who, in the name of humanity and justice, have elaborated a law intended to protect the Indian labourer from improper exploitation.¹

X. Apart from the scarcity of labour there is another factor which militates against the development of the rubber company : namely, the instability of the lines of communication.

At the period of high water steamers of a certain tonnage can reach even the sources of the smallest rivers, but the roads are impassable. At the period of low water, on the contrary, navigation is confined to the circulation of canoes and rafts ; but the roads

¹ Contracts are to be only for two years ; accounts to be drawn up every month ; payment must be in money without deduction of goods advanced excepting instalments of 25 per cent. of the wages. Contracts must be specified and *mozos* registered before a police officer. Changes of employment must be registered and sick workers paid.



INDIAN PORTERS REVICTUALLING A CAMP.



RUBBER TREES (HEVEAS).

render valuable services, although the majority of them are almost effaced.

Besides the *callapos*, of which we have spoken already, rafts are made up during the dry season of the balls of rubber themselves ; which, bound together by ropes or lianas, form a series of rows of gigantic beads, not unlike an abacus filled with counters. As rubber is lighter than water the raft slowly descends the rivers, travelling for days and weeks on end, bearing with it two *seringueiros*, who, perched up on the precious bark, steer it with a long pole, keeping it clear of the banks and the numerous snags formed by tree-trunks half-buried in the sandy bottom of the river.

In the month of September it is curious indeed to watch the descent of these rafts of rubber. The more important *seringals* organize a fleet of two, three, five, or even ten such rafts, all the steering poles being adorned with gaily-coloured ribbons. On such occasions the leading raft usually contains one of the partners of the concession. Each raft has a canoe attached. Sometimes it happens that the strings of rubber balls become unlashd ; at once the canoe is thrown into the water, the scattered spheres of rubber are recovered, a landing is made, the raft is rebuilt, and once all is firm and ship-shape the voyage is resumed. As they float onward the crews play the cornet, or fire on the game to be seen on the banks. When a rapid or a dangerous passage has to be evaded the balls are threaded on poles and carried on the backs of the crew.

How many millions of Bolivians float down the rivers thus and are lost in the rapids !

Bolivia, which used to be at a disadvantage as compared with Brazil in the matter of easy transport, and of the profits realized by the sale of rubber, owing to the remoteness of her rivers, is nevertheless able to deliver cattle on foot to some of her water-

ways, thanks to the creation of various transversal highways which serve certain portions of the rubber country. One of these roads runs from the Upper Beni and Riberalta to Guayaramirim, Exaltacion, and Santa Ana on the Rio Mamoré ; another leads to Reyes and Yacuma. These roads facilitate the importation of cattle to some of the rubber concessions, and diminish the cost of the provisions supplied to the labourers. The region of the lower Madre de Dios communicates by means of such roads with the cattle districts of El Beni, passing the *barracas* of Eten, San Lorenzo, and others on the left bank of the Rio Beni. Another road connects the Rio Orton with Acre. These roads are naturally very bad, being often obliterated by mud or invaded by vegetation, which is only to be expected in a country of periodical inundations ; none the less they answer their purpose and many others are needed.

Many things might be done to ameliorate the conditions of life and diminish its cost, both in the Territory of Colonias and the neighbouring regions of Brazil. During the rainy season the *seringueiro* lives in absolute and most undesirable idleness ; he contracts debts ; he remains almost inactive for five months of the year, whereas a good proportion of this time might and should be given to the accomplishment of all kinds of improvements of a material kind. How useful, for example, would be the making and preservation of new roads ; the building of bridges and of more comfortable dwellings ; the clearing of land, and the creation of plantations, which could be installed by planting the shoots which are so numerous in the forest. The trees felled in clearing the land, instead of being burned, should be used for local building purposes ; thus avoiding the importation of large quantities of timber.¹ Em-

¹ Although there are found in the forests of this Territory, as well as in those of the whole Amazonian basin, more than two

ployers should encourage the installation of plantations in the neighbourhood of their *barracas*, and should allow for work done and improvements made, crediting them to retiring workers and debiting them to those who replace them.

It is also important that when clearings are made such trees as are well provided with foliage and are suitable at a pinch for fodder should be preserved, for the evaporation during the dry season is so extreme that it parches the ground until the ordinary pastures are incapable of nourishing cattle, which at such times feed on the leaves of trees. Pastures should be cleared in such a fashion as to leave plenty of clumps or rows of shade trees ; they will protect the crops and pastures from the sun, so that both will be green and flourishing even during the months of extreme drought.

In the whole of the Territory of Colonias there is a lack of masons, painters, sawyers, carpenters, blacksmiths, saddlers, agricultural labourers, *seringueiros*, and more particularly of female domestic servants.

XI. We must not conclude this sketch of the rubber-producing regions of Bolivia without once more referring to the menace which hangs over the great industry of this region—the menace of Asiatic competition.

Twenty years ago, when a few plantations in Malacca, Java, Sumatra, and Ceylon were first heard of, a few thoughtful minds timidly foretold the danger that might result in the future from the competition of these plantations. On the whole people refused to take such warnings seriously. When, only three or four years ago, at which time we were passing

hundred kinds of timber-trees of great value to the builder and cabinet-maker, the Madeira-Mamoré Company imported from Australia the whole of the sleepers used in building the line, because, despite the distance, these Australian sleepers were cheaper than any that could be obtained on the spot!

through Manaos, we warned certain large Brazilian producers of the imminent arrival of enormous quantities of Asiatic rubbers, and the necessity of initiating methodical plantation of rubber, these gentlemen shrugged their shoulders, stating that their forests were inexhaustible, so that there was no need of such plantations. Yet many of them had witnessed the despatch from Tapajoz and the Madeira to England of the seed selected by Wickham without realizing that these seeds were destined to repeat the curious history of lucerne and the Argentine Republic.

Thirty years after Mr. Wickham's visit the seeds selected by him had become rubber-trees, which are to-day threatening to overshadow the industry dependent upon their ancestral trees of the Amazonian valley. Thanks to the new and multiple applications of rubber and its increasing consumption, thanks to the extraordinary boom of 1909 and 1910, the "black gold" fever spread and spread. In Central America, Asia, and Africa plantations are continually multiplying, and wealthy companies are being formed, which look for handsome dividends from the exploitation of planted rubber.

The rubber of the plantations of the Far East, which is inferior, because less elastic, although cleaner, freer from impurities, and better prepared than the American product, will reach the European markets in ever-increasing quantities, and there obtain a remunerative price. During these years the industry of extracting the product has made no material progress in the Amazonic basin; it has remained what it was, rudimentary, and the losses have not diminished. The *seringueiro*, ignorant and given to traditional methods, has not modified his methods of collecting and preparing the latex. Worse still, he has by his absurd frauds diminished the value of his product, although until lately he had no rivals; introducing foreign substances into the



A BARRACA ON THE RIO BENI.



A RUBBER-COLLECTOR'S HUT.

centre of his balls of raw rubber ; the coagulated latex of the service-tree, the "vegetable cow," or "milk-tree," or various resins, or even dried leaves and stones. Another illicit procedure of the *seringueiro* is to make the first incisions very high up the tree, climbing to the required height by means of a ladder or scaffolding, or to strangle the tree in order to make the latex flow more freely. In many rubber districts of easy access practices as clumsy as they are criminal have resulted in the disappearance of the precious hevea. Even to-day the *seringueiros* employ the clumsy and shortsighted method of making very wide and deep incisions, thus imperilling the life of the tree. Happily such methods are not everywhere possible, as most *seringals* are now inspected by special employees.

The advantage enjoyed by the Asiatic plantations over the virgin Amazonian forests, although the latter produce a better rubber, is obvious. The site of the plantation is selected, either so as to facilitate the task of transport or on account of the fertility of the soil and the salubrity of the district. The trees are planted at convenient intervals, and are grown from carefully chosen seeds. The concentration of the trees makes it possible to build in the centre of the plantation a little village, inhabited by the workers and their families ; and as the workers have their wives and children with them they do not run away or wander ; more, they make a serious practice of agriculture, so that they shall buy nothing, or as little as possible. On the other hand, the worker can deal with three times as many trees as the *seringueiro* of the forest, and that in less time and with less labour. The processes of extraction and coagulation have been perfected ; pressed and passed through rollers, the latex yields a perfect product, which can be despatched straight to the manufacturers without the fear of rebate

owing to excess of moisture or impurities. As for the expenses of transport and the cost of labour, these are so low that with an active, honest, and economical management plantation rubber may be sold at 3s. per lb. and less and yield a handsome dividend.

Would such plantations be impossible on the banks of the Amazon and its tributaries? On the contrary; the hevea is there in its native country; in our opinion it would give even better results than on the Asiatic plantations; but European capitalists are frightened by the scarcity and the relatively high cost of labour. Once again they are mistaken; there are thousands of labourers in the northern States of Brazil, and even those to be found in Bolivia would be sufficient, since in the case of planted rubber they could tap three times as many trees as is now possible. The better sanitary and alimentary conditions, the family life, and the lighter work (the distances covered by the workers would be greatly reduced) would result in a considerable increase in the population, instead of the mortality which now removes numbers of workers annually.

XII. Already, by virtue of the advantages accorded by the Government of Para in 1909, a number of the better informed of the Brazilian capitalists have begun to create plantations. Moreover, the Federal Government, convinced of the danger threatening its second article of export from Asiatic competition, elaborated in the year 1912, after exhaustive and continuous inquiry and thought, a vast and magnificent programme known as the "Economic Defence of Rubber." Millions have been spent, experimental stations have been established, and missions of specialists have surveyed the affluents of the Amazon, in order to teach producers the new methods of extraction. Finally, a series of very precise and practical measures have been taken to

encourage, stimulate, and organize plantations of the hevea, always accompanied by alimentary crops, in all favourable localities.

These measures, perhaps a little late, will not prevent the crisis, but the latter, instead of ending in the irremediable ruin of the industry, will only be temporary, and eventually the great Amazonian industry will become more flourishing than ever. The crisis will have the effect of inflicting a salutary lesson upon an imprudent and wasteful population, which will return to a more practical point of view, and, convinced of its error, will study the progress of modern agriculture in order to reconquer its well-being and independence.

The Peruvian Government, for the same reasons fearing the diminution of its exports of rubber, and realizing the serious results that would ensue from the maintenance of the old bad methods of exploitation in its rubber districts, has decided to put an end to them, and has ordered the cultivation of rubber-trees in all suitable localities. It has just established in one of the richest regions, that of the Peruvian Madre de Dios, an Experimental Station of Agriculture, with an excellent equipment, with the object of promoting the scientific cultivation of rubber, as well as that of other products whose exploitation has hitherto been neglected.

In our opinion, the produce of the plantations of the Far East can never swamp nor replace the Amazonian supply of rubber, for the Asiatic heveas are the victims of parasites and cryptogamic diseases, which occasion a certain amount of damage and loss. On the other hand, in spite of the methodical treatment of the exploited trees, the term of production is short, and many trees die at the end of a few years. Nevertheless, we must realize that new plantations are being established daily—plantations representing millions of trees which will produce rubber

greatly superior to the South American product, which will result in competition which America will survive at the price of a serious crisis.

To struggle effectually against this competition there is only one effectual means: a considerable decrease in the cost of production, and also a larger production. This can only be effected as the result of rational plantation and the reduction of the cost of provisions and of transport. At present the navigation companies greatly abuse the situation.

XIII. If the Bolivian Government, which draws large revenues from the rubber industry, would not see the source of these revenues dry up, and the vast forests of El Beni and the Territory of Colonias abandoned and resumed by the Indians, it must take measures similar to those already in force in neighbouring countries, and must, above all, supervise their execution. The Bolivian establishments even will gain a great advantage in the struggle over those of Peru by the completion of the Madeira-Mamoré railway.¹

The influence of this railway is already sensible, and the owners of concessions are now realizing large economies in provisioning the stores of their *barracas*. Where a short time ago it cost, say, £8,000 to support the staff of *seringueiros* on a large *barraca*, it now costs no more than £4,800, a figure which will diminish yearly, when plantations of food crops accompany those of rubber-trees, and when the Guayramerin-Riberalta branch, a prolongation of the Madeira-Mamoré railway on Bolivian territory, shall permit of the circumvention of the Cachuela Esperanza. In this way the apparent loss caused by the fall of prices will

¹ The construction of this line, which required a colossal effort, cost more than six millions sterling; it is one of the most costly for its length in the world, this figure exceeding the original estimate by 60 per cent.

be balanced by the lessened cost of production and transport. Already the day's wage of the Bolivian peon, which was 6 Bs., with food, has fallen to 4 Bs., and the relief is appreciable.

It remains to the Bolivian Government to organize a permanent and effectual inspection of the industry of extraction; it will advise, and at need require, the plantation of the hevea; it will give practical instruction, through the medium of authorized experts, in the method of tapping the trees, and of establishing on the tracts adjacent to the highways and the rivers, and even in the depth of the forest, which in places needs only to be cleared, plantations which should by preference be initiated during the rainy season, or between December and April.

It is also most necessary in the interests of the future development of this region, if not of the whole Republic, that the Government should abrogate as quickly as possible¹ the law of 1905 concerning vacant lands, which facilitated land monopolization at the cost of a small outlay (about 2d. per two and a half acres), so that immense tracts of land can be held as a speculation without in any way benefiting the community.²

The law of 1895 created a deplorable situation; it authorized the sale of vacant lands under the style of *estradas* without any limitation other than the number of 150 rubber-trees to the *estrada*; trees which might be scattered over enormous areas.

¹ This abrogation is about to become a fact. The Government also proposes to impose a tax of two centavos per hectare upon all concessions in order to force concessionaires to dispose of land which they are holding in idleness; this will constitute a revenue which will contribute to the progress of the region affected.

² Ten proprietors hold among them in the Territory of Colonias no less than 25 million acres, mostly unexploited; a single individual of these holds 17½ million acres!

An attempt was made to amend the situation by the law of 1905, which adopted the hectare (2.48 acres) as the unit of measurement. Under the name of rubber concessions lands have been included with or without rubber-trees, which has resulted in the creation of incredible latifundios of hundreds of square leagues. Nearly all the best lands on the banks of the larger rivers have been monopolized, usually by persons incapable of colonizing or exploiting them, without either experience or capital; and it is possible that even larger areas are falling into the hands of the great railway companies. These ill-considered and vaguely delimited concessions will in the future produce, as they have already produced, the disastrous result that the land cannot be peopled, since it is impossible to obtain allotments for labourers or colonists.

The Government should also encourage the free immigration of native labourers, especially families of workers, the family being the prime basis of progress and prosperity in this region; for wife and family would check the exodus of the workers and inhabitants of the Territory of Colonias and the province of Vaca Diez (which will probably be annexed thereto), above all, if each individual were granted a small holding, as is intended in the case of time-expired soldiers. Without permanent labour, without families rooted in the soil, all projects for the future must remain illusory.

Finally, in order to complete this programme, the Legislature should consider the situation of the aborigines of the Territory of Colonias and the neighbouring departments, whether nomadic or sedentary and semi-civilized. The law must effectively protect them against abuse, violence, and persecution, of which they are too often the victims at the hands of those who exploit those regions. Already the missions of Cavinaz and others are employing them;

but there are too few of these ; and, moreover, this primitive population should be incorporated in the economic organism of the nation, so that it may become a productive force. Laws appropriate to this object should be promulgated, to the good of humanity and the real interests of civilization.

CHAPTER XVII

THE MINES AND THE MINING INDUSTRY. GOLD

- I. The mineral wealth of Bolivia. The auriferous regions.—II. The mineral deposits of the province of Larecaja : Tipuani. Their nature and origin.—III. Alluvial beds.—IV. Difficulties of access to deposits. The Incahuara Dredging Company.—V. The principal concessions of the Tipuani Valley. Measures in other provinces of the department of La Paz. The ChuquiagUILlo Company.—VI. The gold mines of El Beni, Cochabamba, Potosi, and Chuquisaca.—VII. The auriferous region of Santa Cruz. Its importance.—VIII. Gold-mining in the past ; its present decadence. Production and exportation.

I. THE mineral wealth of Bolivia is so marvellous that the learned naturalist Raimondi said, in speaking of the high table-land of Bolivia : "It is a table of silver supported by columns of gold."

This description, far from being exaggerated, is too far within the mark, for the whole country abounds in the greatest variety of metals. It is hardly inexact to say that every kind of metal and mineral known is to be found in Bolivia. To name only a few, there are gold, silver, tin, copper, platinum, bismuth, manganese, wolfram, iron, mercury, sulphur, antimony, asbestos, cobalt, arsenic, lead, zinc, petroleum, marble of all sorts, alabaster, porphyry, malachite, emeralds, opals, lapis-lazuli, china-clay, saltpetre, borax, salt, etc.

There are thousands of known lodes and veins of minerals ; to the mines discovered by the *conquistadores*, which they forced the conquered peoples to

work in their primitive fashion, others have continually been added, and it is hard to say which are the richer ; yet the present development of the country is due to the working of only a very small number of these mineral lodes. It would take pages to cite them all, with their names and localities ; we will confine ourselves to denoting the most important mining belts, and those mines in which the more precious minerals are worked on a fairly large scale.

Gold is extremely abundant in certain regions of Bolivia, and it may be supposed that it exists throughout the country. It is found sometimes in veins or seams of quartz, and sometimes in alluvial deposits. These latter especially contain gold in the greatest abundance, and besides these deposits the veins of antimony so common in Bolivia contain gold in mechanical or chemical admixture. The Bolivian auriferous deposits may be divided into three great belts.

Of these the first and best-known has its origin in the north-west, in the province of Muñecas, the basin of the Inambari ; thence it extends to the eastern frontier on the banks of the Upper Paraguay. This belt comprises all that mountainous belt which traverses the provinces of Caupolicán, Muñecas, Larecaja, Yungas, Inquisivi, and Loaiza in the department of La Paz, continues through the department of Cochabamba, and loses itself in that of Santa Cruz, towards the banks of the Paraguay. It is in this belt that the famous deposits and gold-washings are found of Tipuani, Suches, Chuquiaguillo, Los Cajones, Yani, Cavari, Sorattoco, Chiquitos, San Javier, San Simón, and the affluents of the Itenez.

The second belt commences in the south-west in the province of Lipez, turns a little to the south of Tupiza to enter the department of Santa Cruz, and in this region forms an angle with the preceding belt. It crosses the provinces of Chayanta, Sur Chichas (in

the department of Potosi), Mendez, in Tarija, and Cinti and Acero, in Chuquisaca. The principal deposits in this belt are those of San Juan del Oro, Amayapampa, Suipacha, Esmoraca, Chuquichuqui and the Rio San Juan, and there are many others.

The third belt appertains to the Amazonian basin. It stretches to the north-west of the Republic, its limits being the Peruvian mining district of Carabaya and the sources of the Purus, the Madre de Dios, and the Acre. It is the complement of the preceding zone ; the true auriferous region, the richest in alluvial deposits. One may say that its rivers flow with gold, but it is the least worked of all the gold-bearing regions, being, indeed, practically unexploited.

II. It is in those portions of the country which as yet are too little known, and particularly in Tipuani, that the production of gold would become of the greatest importance were the means of communication improved.¹ To reach the prodigious auriferous measures of Larecaja one must pass by Sorata and climb the slopes of Nevado to a height of 15,000 feet ; there one descends through a pass into the basin of the Amazon, and at last the Rio Tipuani is attained. The country hereabouts is not healthy ; the too luxuriant vegetation and the excess of rain breed paludian fevers. There is no doubt that these unfavourable conditions would be greatly improved by clearing the forests and establishing alimentary crops, and perhaps by a certain amount of drainage.

In addition to veins of quartz which have hitherto been imperfectly surveyed, the deposits of auriferous earths in the region of the Tipuani, which offer a great field of exploitation, come under the four fol-

¹ The Northern Railway, which will follow the valley of the Mapiri, will pass through the neighbourhood of the rich deposits of Tipuani, whose exploitation is continually interrupted by the difficulty of transport, which makes the installation of modern machinery a ruinous matter.

lowing headings : (1) the *cangalli*, which are beds of ancient formation ; (2) the deposits formed on the plane of the present river-beds ; (3) the deposits below the present level of the waters and in the beds of ravines ; (4) the mountain deposits, or auriferous lands lying between the rivers and the mountains.

The two first types of deposit have been the object of a certain amount of exploitation now and in the past. This is not the case with the deposits found stretching for miles in the beds of ravines and on certain river-beaches ; they might be exploited for years to come with the certainty of a handsome profit. It is in the last category that the richest and most durable deposits are found, although the gold is irregularly distributed. Such deposits occur not only in Tipuani but throughout the province of Larecaja.

At a very remote period, long before the arrival of the Spaniards, there were gold workings in the auriferous region of Tipuani. The exploitations of the early inhabitants were carried out in a very primitive manner, for they had neither steel nor iron. They attacked the veins with tools of stone or native copper and levers of wood. They brayed the auriferous quartz thus obtained by means of heavy stones. They washed the detritus thus obtained, and also the sands of the rivers. These early miners succeeded in exploiting not only the sands in their richest portion, but also a certain number of lodes ; but the latter were not very numerous.

It was only in the midst of the sixteenth century that the Spaniards learned of the goldfields of Tipuani, and since that period they have never been worked in a serious and persevering manner.

The primitive surface of this region was probably covered, in the first place, at a period anterior to the present geological epoch, and probably shortly after the raising of the Andes, by a layer varying in depth of auriferous sands, of torrential or lacustrine origin.

These deposits were redistributed by the waters, and the present valleys were cut by erosion. One thing is certain, that throughout the auriferous region of the Tipuani, which consists of a deposit 120 miles in length and 50 miles in width, no rocks are now found in their original positions. The small rivers which flow into the main stream have scoured the sandy beds at various points, and at depths varying from 50 to 180 feet nowhere has the plane of the rock been encountered. Wells and other borings of various depths have yielded a like result.

The absolute absence of volcanic vestiges, which are almost the rule in other auriferous regions, greatly facilitates the extraction of gold from these formations and makes it an easy matter to attain to considerable depths. The expenses of working are always covered, for the deeper the deposit the richer in gold. In all the old workings not a single stratum has been discovered which did not yield a certain quantity of gold. Even at the surface traces of gold are invariably found.

III. All the strata capable of being worked are formed of sand, clay, and stones, and vary in depth from 50 to 330 feet. They are distinguished one from another by their colour, and by the dimensions of the stones or grains of sand. The predominating strata are of an ashy blue, of varying depth, according to the proportion of oxide of iron and its state of oxidation, which increases on exposure to the air.

Some layers are barren in places, others are known as *veneros* or *venerillos* (veins). There the gold occurs in very thin flakes, of a bright yellow, and attains a purity of 98 per cent. ; large masses are rare. The methods of extraction are still of the most primitive ; in the "veins" a load gives an average of 25 to 30 grammes of gold ; elsewhere the proportion is only one or two ounces per ton. Where the superimposed layers are shallow the workings may



HYDRAULIC MINING, SORATA.



HYDRAULIC MINING, CHUQUIAGUILLO.

be open, as at the village of Tipuani ; in other places shafts and galleries are sunk as in an ordinary mine. The numerous localities devoid of "veins," where the wealth of the deposit is comparatively small, are perfectly suited to hydraulic treatment. But such exploitation demands efforts unimaginable to those who do not know the country. It is the same with every undertaking, whether rubber or coffee (which is very good) or some other product be the thing exploited ; it must be carefully thought out on the spot.

IV. The region is almost a wilderness. It can be reached only by a mule-track, and a bad one at that ; it is often encumbered with rocks which bar the way, or is bordered by precipices or cascades ; and thirteen secondary valleys must be crossed before the valley of the Tipuani is reached. At the present time it costs 17s. 6d. to 19s. 3d. (11 to 12 Bolivians) for each load of 25 lb. carried on the back of a mule (or very often an Indian) from La Paz to Tipuani. Those who know this region will not be surprised by these prices ; they will rather be surprised that any transport at all should be possible. It will readily be understood that under such conditions industrial work is extremely difficult, indeed well-nigh impossible ; yet one feels that it might be accomplished under satisfactory conditions after important but costly improvements in the roads.

There are many mines in Bolivia which would not at once yield appreciable profits, and owing to the lack of labour these are not exploited. All this will be improved in the future ; when once a passable road with bridges over the rivers runs from Sorata to Tipuani, all things will be possible.

Twenty years ago at most an English company tried to install machinery to work the auriferous sands of Tipuani. They met with a checkmate, for a good part of their plant remained on the road or fell into torrents.

Another company, the Incahuara Dredging Company, has renewed the attempt and has succeeded, thanks to its perseverance. This company, which has a large capital at its disposal, has amalgamated several concessions situated on the auriferous reaches of the Rio Guanay or Kaka. It transported to the spot, in spite of enormous difficulties, the machinery proper to the work, including a powerful dredge, which has been successfully assembled. In spite of innumerable obstacles which might well have discouraged the bravest, the company persevered, and despite the scarcity of labour and the means of life the preparatory work of installation has been completed, and by the time these lines appear the exploitation of its concessions should have commenced.

If we have lingered a little over the gold-bearing region of Tipuani, it is on account of its extreme wealth ; sooner or later its deposits are bound to attract the attention of men whose capital, intelligently and practically applied, will earn handsome dividends.

V. The number of mines and concessions in the valley of Tipuani is fairly large ; to enumerate them all would demand too much space, and would be of no great interest, especially as they vary little save in their more or less favourable positions.¹

On the other hand, these concessions have not as yet been largely and continuously worked ; the work done on them has really been experimental, and therefore almost superfluous, since the whole belt is perfectly well known to be of the same character. Among the richest workings we may mention the Gritado mines, a concession bearing the name of a small affluent of the Tipuani, which descends, like so many of the smaller tributaries, from mountains

¹ Those interested should turn to *El Oro en Bolivia*, by Señor M. V. Ballivian, or the *Monografía de la Industria Minera en Bolivia*, by A. Blanco.

covered with auriferous granitic sands. This mine has been worked intermittently for a long time ; one of the latest concessionaires, Señor Ildefonso Villamil, obtained 32,769 ounces of gold from it between 1852 and 1862, and that by primitive methods.

The Ancato mine, which is near the village of Tipuani, yielded the Villamil family 33,989 ounces of gold in the course of a long period of working, lasting from 1825 to 1868, but with protracted interruptions. Other well-known mines in the same region are the Romanplaya, Chuquini, Salomon, Tinajani, Sunturu, Angelica, and Chuchiplaya mines. This last mine, which lies at a bend of the Rio Tipuani, some 70 miles from the city of Sorata and 106 from Lake Titicaca, was exploited by a French company which suspended operations through lack of proper management after the derangement of the drainage-pump, despite a yield of 3 ounces per load.

The province of Larecaja contains, in addition to the Tipuani deposits, a large number of veins of quartz and alluvial deposits, these lying in the cantons of Itulaya, Yani, Challana, and Sorata (in which canton the claims for concessions have been least numerous).

We must not omit to mention the provinces of Caupolican, Omasuyos, and Sur-Yungas, in which a wealthy London syndicate, the Olla de Oro Gold Mining Company, Limited, has begun to work the lodes in the Umabamba Mountains ; nor the province of Loaiza, with its rich Araca mines, situated in a region easy to exploit and well provided with the means of life ; nor Inquisivi, with the mines of Churquicamini, colossally productive, which were formerly exploited by the Jesuits and were filled up by the Indians, in 1666, at the end of a revolt. These mines, the majority of which have never been rediscovered, are abandoned owing to the lack of roads,

guides, and the elements of life in a region almost uninhabited.

In the same department of La Paz, which is the richest in gold of all the departments of Bolivia, is also the province of Cercado, to-day Murillo, with mines which have been worked superficially. The Choquiyapu or Chuquiapu, a river or torrent which traverses La Paz, is celebrated for the gold which it contains. However, only one large enterprise exists in the environs of the city: the Empresa Chuquiaguillo, which covers an area of 2,879 acres on the banks of the Rio Orco-Jahuira, some four miles from La Paz. These alluvial deposits, the oldest now exploited, have produced in other times some marvellous nuggets, one of which, weighing 50 lb., is preserved in the museum of Madrid. In May, 1904, was found a nugget of gold and quartz weighing $52\frac{1}{2}$ ounces, of which 47 were of pure gold; since when many others of less weight have been discovered. After changing hands many times, these deposits are now the property of a wealthy North American syndicate, which at the time of our visit was installing improved machinery for a serious exploitation; one hundred miners were employed, earning from 1 to 3 Bs. a day, according to class.

VI. In the department of El Beni it is incontestable that the beds of the innumerable affluents of the Beni, Mamoré, and Guaporé (Itenez) hold large quantities of the precious metal. The department of Oruro contains among other auriferous deposits those of Iroco and La Joya.

The department of Cochabamba contains the rich lodes and placer mines of Choquecamata, Santa Elena, Cacapata, and Cotacajes, formerly known for their great wealth and to-day abandoned for lack of capital.

In the department of Potosi are the rich auriferous deposits of Amayapampa, Chocaya, Esmoraca, Portu-

galete, the Rio San Juan del Oro, and Paconata. In the mountain of this last name, on the road from Uyuni to Potosi, the French Gold Mining Company owns workings known as the Eldorado of Poconata. The veins in sight gave on assay a maximum of 12·6 ounces per ton of ferruginous quartz. The concession, which consists of about 100 acres, lies at an altitude of 9,840 feet above sea-level. We do not know the results of this exploitation; they cannot hitherto have been very brilliant on account of the cost of transport and the great expenses assumed, which, as in too many cases, amount to the whole capital.

In the department of Chuquisaca are the auriferous formations of Pilaya, Maragua, Apoquiquisani, and Malmisa.

VII. The department of Santa Cruz contains rich gold deposits; for instance, those of Santa Rosa, San Janvier, Concepcion, Tucbaca, Santo Tomas, the alluvial deposits of Jani, Sucre, and other localities. It is estimated that in the neighbourhood of Sucre there are 195 million cubic yards of alluvial deposit containing gold to the value of 7d. to the cubic yard, and at Jani 27 million cubic yards containing gold to the value of 9d. to the cubic yard. These deposits, which lie on the eastern slope of the Andes, might be exploited without heavy expenses, for there is no lack of hydraulic power.

Greater difficulties would be encountered in the exploitation of the very important deposits found in the same department in the province of Velasco, which lie in the temperate eastern region which extends to the Paraguay and Matto Grosso in Brazil. However, this tract is not such a wilderness as Tipuani, and is more accessible, access being indeed only a matter of time. To reach it one may ascend the Rio Paraguay by steamer as far as Corumba, thence one enters Bolivia by a tract of vast plains

whose undulations run from 800 to 1,600 feet in altitude. We have already spoken of the route to Santa Cruz from La Paz and the Pacific coast.

The soil of Velasco, of which only a few tracts have been cleared for cultivation, is rich and virgin. The easiest mines to exploit are of course the placer mines. But the slope of the soil being much less than in Tipuani, the question of the water supply and the matter of draining the mines previously to washing the sands for gold plays a more important part.

The mountainous formations containing veins of gold whose destruction has given rise to the placers is, according to the engineers who have surveyed it, Silurian or pre-Silurian. The strata in question are mica-schists ; the absence of fossils makes it difficult to place them exactly ; to do so would require a geological examination, which has not as yet been made.

As a beginning, the veins being somewhat rare, it would be best to begin by working the placer deposits, which are richest in the bottom of the valleys of rupture, or *quebradas*, where the presence of water is an obstacle to extraction. The draining of shafts and galleries will thus play an important part in the exploitation of the alluvial deposits of this portion of Bolivia, which constitute an important reserve for the future.

Hitherto these deposits have been worked only by the load, that is, on a very small scale. The machinery employed resembles an enormous plate of peculiar form, holding 33 to 66 lb. of the sand extracted from shaft or gallery. It is not rare to obtain a result of 1 ounce of gold per load, of the value of 64s. We are citing only from memory when we state that the specimens of auriferous measures brought to France in 1901 by MM. Mortillet and Vial, of the S  n  chal de Lagrange mission, yielded over 17 ounces to the ton. What is certain is that

yields of 150 to 300 grains per load are considered as negligible. With proper sluices and other apparatus, which have not yet been employed, the most excellent results would be obtained.

In the Velasco region there is no lack of three things: gold, water, and wood. Local labour, although somewhat scarce, can be obtained on fairly advantageous terms. A miner will ask 1s. 7d. to 6s. 4d. per diem, according to his speciality. If the railway which is to unite Santa Cruz to the banks of the Upper Paraguay and Matto Grosso becomes a reality, it is easy to foresee what improvements could be introduced.

VIII. Despite their great wealth the gold mines of Bolivia are to-day almost entirely abandoned or unexploited, the majority of the concessionaires simply retaining their rights by the payment of royalties. Observing the stagnation of this industry, it is difficult to believe that between 1540 and 1750, or in the space of two hundred and ten years, the gold mines of Bolivia produced the sum of 420 millions of pounds sterling, despite primitive methods of exploitation. Between 1750 and the beginning of the nineteenth century the mines and washings of the provinces of Larecaja and Caupolicán alone (in the department of La Paz) yielded £3,200,000, and between 1818 and 1868 they produced 150,786 ounces, most of it being extracted by the Villamil family. The product of other Bolivian gold mines from 1750 to 1900 is estimated at £25,000,000.

If the primitive methods employed in the first place by the Incas and continued with very little modification by the Spaniards during their period of domination were able to produce such results, there is no doubt that the employment of improved modern procedures, whose installation would be facilitated by better means of transport, would set Bolivia in the first rank of gold-producing countries.

The true figures of the production and exportation of gold are absolutely unknown to the Bolivian statistician, because the greater part, not to say the whole, of the gold produced is exported in clandestine fashion over the Peruvian frontier, although the export tax on gold is only 20 centavos (less than 4d.) per ounce. Owing to the difficulty of access to the mines and deposits, the gold-mining industry is, as we have seen, almost paralysed ; but the Indians, whose patience is proverbial and whose needs are negligible, succeed, by employing primitive methods of extraction, in obtaining notable quantities of gold from the alluvial deposits and the sand of the rivers, but they certainly are not the people to advertise the amount of their gains.

In 1913 such statistics as existed showed a production oscillating between 1,012 and 1,210 lb. (16,192 and 19,360 ounces) ; before that date they gave figures most improbably wandering between 20 and 77 lb. (the figure for 1912). As there is nothing to justify such a difference we may with some chance of truth put the production of gold in Bolivia approximately at 1,210 lb. and its official value at £22,000.

CHAPTER XVIII

THE MINES AND THE MINING INDUSTRY. SILVER

I. Argentiferous formations. Purity and variety of ores.—II. The lodes of Potosi, Oruro, La Paz, and Cochabamba.—III. The most celebrated mines and mining centres. The Cerro of Potosi ; the quality of its mines ; the causes of its temporary decadence.—IV. The Real Socavon of Potosi. — V. The Pulacayo-Huanchaca mines. Capital of the *Compañía Huanchaca de Bolivia*. Fabulous profits.—VI. From Uyuni to Pulacayo. Immense workings and extensive plant.—VII. The nature of the lodes ; their wealth and the purity of the silver. Smelting-works.—VIII. Flooding and draining of the mines of Pulacayo. Their present condition.—IX. The Oruro silver mines ; the treatment of ores. A mine of the future paralysed : La Tetilla. Colquechaca.—X. Table of the production and exportation of Bolivian silver.

I. BOLIVIA is known as one of the three nations which have produced the most silver, the others being Mexico and Australia. There have been periods when the yield was of hundreds of millions of ounces a year. Silver, either in the form of composite sulphides or associated with oxides of tin, holds a very considerable place among the minerals of the Royal Cordillera and its ramifications.

A great part of Bolivia possesses argentiferous formations which are widely exploited and very highly productive. The number of mines and rich lodes is innumerable ; but at present the greater number—about ten thousand, in fact—are abandoned or nearly so ; an infinity of others have suspended

or reduced their operations ; there are only a few mines, and these the largest, which are being more or less actively worked. This situation is not due to any lack of silver ; on the other hand, it exists in superabundance ; but a variety of causes, of which the chief are the lack of capital and proper means of transport and modern machinery, including pumps for draining purposes, and above all the fall in the price of metallic silver, have for a long time paralysed a large number of the mines. For some time now, however, the transport of the country has been improved, and as the price of silver has risen somewhat it is reasonable to hope for a resumption of activity, at least in the principal mines.

The richest ores of silver found in the Bolivian mines yield 1,000 to 5,000 marks (230 to 1,150 kilos) per caisson (cajon = 2,300 kilos) ; some have yielded as much as 8,000 marks ; in other words, the ores contain from 10 to 50 and even 80 per cent. of silver. The minerals which attain to this degree of richness are the native silver or *rosicler*, and the sulphides, which are known in Bolivia under different denominations ; *canutilla*, *barra*, *fierro viejo pasamano*, etc. Then come the ores of a richness of 100 to 1,000 marks per caisson, or 1 to 10 per cent., known as *negrillos* and *acerados*.

II. The department of Potosi is that which contains the richest and most numerous veins of silver, for it is here are the famous mining centres of Huanchaca, Aullagas, Ocuri, Porco, Guadalups, Portugalete, Carguiacollo, Chlorolque, Tomave, Lipez, Andacaba, Chachacomani, Turqui, and, above all, the celebrated Cerro de Potosi, which has yielded so much wealth to the Crown of Spain.¹

¹ During the first forty years of its exploitation the Cerro yielded the enormous quantity of £14,691,176 sterling, without reckoning what may have gone astray. The royal dues of one-fifth amounted to £80,000 to £120,000 a year and more. In 107 years these dues of one-fifth produced the fabulous sum of 3,240 millions of piastres.

In the province of Cercado, not far from Potosi, are the large mining establishments of Soux, Hernandez and Co., Bebin Brothers, Aluralde, and various others, which exploit on a large scale mines producing tin as well as silver, all being situated in the Cerro of Potosi. The Huanchaca Company of Bolivia, of which we shall speak presently, one of the most remarkable for its costly but perfect installations, is located in the province of Porco.

In the province of Linares are the rich mines of Andacaba and El Carmen, at present stopped for lack of capital. The province of Sur-Chicas contains the rich lodes of Portugalete, Chocaya, Atocha, Chlorolque, Estasca, etc., which are not very actively worked. The same is true of the mines of San Cristobal, San Antonio, Santa Isabel, Coya-Huasi, and Ustutunco in the province of Lipez. In the province of Chayanta we may cite the ancient workings of Colquechaca ; which, after yielding immense quantities of *rosicler*, were one day invaded by the waters, whereby work has been almost entirely interrupted.

The department of Oruro is, after that of Potosi, the richest in argentiferous formations. Cercado contains the rich and important mines of El Socavon del Vergen and of the Compañia Minera of San José and the Tetilla ; in the latter mine work is at present suspended. In the province of Paria in the same department are the Santo Julio, Pampar-Rosario, Cataviri, and Trinacria mines. The lodes of Condo, in the province of Abaroa, and those of Carangas and Negrillos in the province of Carangas, enjoy a great reputation on account of the enormous numbers of workings which were exploited here during the Spanish domination.

Near the village of Macha, some seven miles from Challapata station on the Antofagasta-Oruro line, four lodes of extremely rich ore have been recently

discovered. Three of these lodes are at a distance of some 500 yards from one another, while the fourth lies some 40 yards distant from the principal lode, in a ravine 650 feet in depth. This ravine also contains a bed of white auriferous quartz. Near these lodes is a beautiful valley with abundant water and fertile soil.

In the department of La Paz we may cite the formations of Colquiri, Capinata, Chuquichambi, and Hucamarini, as well as of Sayaquiri and Cavaré in the province of Inquisivi ; and of Laurani, Pacuani, Sasari, and Chuacollo in the province of Sicasica.

The department of Cochabamba contains the argentiferous measures of Ayopaya, Arque, and Choquecamata, at present paralysed by want of capital. Chuquisaca contains the formations of San Lucas, Huato, and Pojo.

III. Let us now proceed to a few details of the more celebrated mining centres. In the first place let us take that of Potosi, where no less than £320,000,000 of silver has been extracted and treated by amalgamation. We have already spoken of the Cerro, or mountain, of Potosi, which forms a perfect sugar-loaf, 16,098 feet in height above sea-level, and 2,500 feet above the level of the Potosi market-place. The lode runs to the summit of the mountain, which is 7,640 yards wide at the base ; more than sixty different lodes have been recorded, and the surface is honeycombed with cavities remaining from ancient workings. Of the five thousand shafts and galleries that were once in existence more than a thousand are visible now.

The ores found in the Cerro are native silver, protochlorides containing as much as 75 per cent. of silver, and antimonial sulphides containing 59 to 64 per cent. The mines have hardly ever been carried below the surface of the plain, but it is probable that considerable wealth lies beneath its surface. Nowa-

days it is rarely that the annual yield exceeds 20,000 or 30,000 marks.

The causes of the decadence of the mines of Potosi are many. In the first place the mines were badly worked, the Spaniards having no knowledge of mining ; careless of the future, they only sought to obtain the largest possible profits as quickly as possible. A second cause of decay is a lack of metallurgical knowledge in the matter of treatment. The Spaniards and their successors treated the most various ores in the same manner ; chlorides or sulphides, all were treated by amalgamation, and scarcely two-thirds of the silver contained in the sulphides was saved, while large quantities of mercury were lost at the same time.

The third cause is the lack of capital, which might purchase rock-drills and ventilating and pumping machinery, and install improved methods of extraction. Bolivia suffers from a lack of competent engineers. However, capital has been sought abroad, and certain mines purchased by English companies, are now being actively exploited.

To these causes of stagnation we must add the great fall in the price of silver and the increasing wages demanded by the workers.

In certain of these mines the working is effected by an association of the masters and the workers ; for more than a hundred and fifty years a contract has been in usage, by virtue of which the miners are paid for their labour by half the ore extracted. This system encourages the workers to export the rich ores as contraband, leaving only the poorer ore to be divided between the mine-owner and themselves. Mines thus worked are at the mercy of ignorant and greedy workers, and as every one profits by these thefts with the exception of the owners, it is very difficult to repress them.

In other mines there survives a custom, formerly

common to all the mines of Bolivia, of requiring the workers to work for thirty-six consecutive hours, ten hours' work being actually accomplished and the rest paid for, to the loss of the owner.

The ore is treated in small crushing-houses known as *trapiches*, where it is triturated and pulverized by means of a primitive device known as the *trapiche* or the *quimbalete*. In these establishments only the ore stolen or that rightly reverting to the workers is treated. Some forty of these trapiches are still in existence, and those of the first class pay a tax of 9s. per annum to the municipality.

The silver produced by the method of amalgamation is sold by these small establishments to the silver merchants, who are veritable usurers, advancing the workers what they need and charging them 10 per cent. per month for it.

Besides these primitive establishments there are others of larger size, whose number amounted to forty at the beginning of the last century ; at the present time there are only fifteen. After treating the ores by the amalgamation process, they are unanimous in subjecting it to the "wet" process invented by Russell, and known as lixiviation. This is the only economical and practical process to follow with the ores locally known as *negrillos*, which are the most abundant and almost the only ores now left in the mines.

Lixiviation, introduced a few years ago, comprises braying the ore to a fine powder, converting it to chloride by roasting, mixing it with sea-salt, treating it to a ley of hyposulphite, and finally precipitating the silver in the state of sulphide.

IV. The ores of Potosi, which originally consisted of 60 per cent. and more of silver, containing as they did much native silver, have grown poorer as the galleries have penetrated the flanks of the mountain, while the proportion of iron pyrites increases. In

view of this impoverishment a new company was formed to exploit the Real Socavon de Potosi, which, by means of a long tunnel, recovered at a considerable depth the lode which was so rich at the summit of the peak. Unfortunately it had not, where recovered, the ancient value; the ores contained only at most 4 to 6 lb. of silver per ton and 10 per cent. of tin. These ores are subjected to roasting in a vertical furnace or kiln, and then amalgamated in copper vessels, called *cazos*, in the presence of hot brine. The silver, separated from the mercury, is run into ingots and sold in that form, unless it is reduced to silver piastres by the Mint of Potosi. This process is imperfect, for the residues or washings contain as much as 15 ounces to the ton.

The company now working the Real Socavon is the "Royal Silver Mines of Potosi, Bolivia, Ltd.," an English company, operating with a capital of £300,000. After some difficulties this company succeeded in installing a model works for the treatment of ores. It employs about two hundred men at wages varying from 1 B. to 2 Bs. per diem. We have already given details of the other companies working this centre, which will certainly, as a result of the recent arrival of the railway, undergo a fresh development.

V. Before leaving the department of Potosi we must give a few details relating to the mines of Pulacayo, worked by the Huanchaca Company, the most influential in Bolivia.

The mine or mining district of Huanchaca-Pulacayo, the queen of South American silver mines, lies in the province of Porco, to the east of Uyuni, in the range of sedimentary formations which forms a spur among the eruptive rocks of the Royal Cordillera. It consists of a dozen groups of mines, covering in all some 8,500 acres, the Pulacayo mines themselves, which form the principal group, covering 2,500 acres. The whole forms an argentiferous bed

of fabulous richness, which has passed through the most interesting vicissitudes. It was first worked towards the end of the eighteenth century, but was abandoned by its proprietors on account of the Wars of Independence. The working was resumed in 1832, and continued spasmodically down to 1872, when the *Compañía Huanchaca de Bolivia* was constituted with a capital of £480,000, divided into 6,000 shares of £80 each. In 1890, the articles of the company having been reconstituted, the capital was increased to £1,600,000, divided into 320,000 shares of a nominal value of £5. Each holder of the old shares received 40 new shares for each original share ; and 80,000 of the new shares were reserved and sold for £800,000, which was distributed as dividend to the old shareholders. To-day 58,081 of these shares in circulation are nominative and 261,919 are bearer shares. The majority of the shares of the Huanchaca mines are held in France, a certain number in Chile, and the rest in England, Belgium, and Germany.

The mines of Pulacayo have for many years yielded enormous profits. For some time a regular dividend of £400,000 was distributed, but twelve years ago the galleries were flooded to the mouths of the shafts by hot water giving off carbon dioxide.

From 1873, the date of its formation, to 1901 the *Compañía Huanchaca* produced the enormous quantity of 4,250 tons of silver. In 1909 it yielded 83 tons of silver, despite the partial working due to the fall in the price of silver ; but since then it does not appear that dividends have been paid.

VI. After providing himself with a permit (for the company is sovereign within the limits of its concession) the traveller goes from Uyuni to Pulacayo by a railway some twenty miles in length, with a gauge of three-quarters of a metre, the property of the company. This line rapidly rises from an



THE PULACAYO-HUANCHACA MINES—TRYING GROUND.



THE REAL SOCAVON, POTOSI.

altitude of 11,800 feet to one of 13,700 feet. It is impossible to imagine a more magnificent view than that which the traveller enjoys during this trip. The outlook is over the high table-land of Bolivia, that ancient inland sea, now an ocean of reddish sandstone and grey sands, sprinkled with salt lagoons which have evaporated, leaving plains of salt which sparkle in the sun. A girdle of snow mountains and smoking volcanoes borders the horizon as far as the frontiers of Chile and Peru. It is a magnificent and unforgettable spectacle.

From the time of its formation the company wished to build a railway which should be its own property and which should run to one of the Pacific ports, in order to export the product of its mines and procure the necessary fuel and the wood for its galleries. This was a considerable undertaking. Absorbing, as a commencement, the narrow-gauge railway which served the nitrate works of El Carmen and the warehouses of Antofagasta, it gradually extended it by way of Calama and Uyuni, after crossing the Cordillera by the pass of Ascotan, and the frontier at the foot of the volcano Ollagüe. In exchange for the authorization to build this line the State required the company to build the branch line from Uyuni to Oruro, which was later to become part of the network of the Bolivian railway system. As soon as this branch was completed the Compañía Huanchaca sold its railway to an English company, which allowed it to exploit the line for a number of years in consideration of a payment of 5 per cent. on the capital sum for which it was sold. To-day this company, now the powerful Bolivia Railway Company, has resumed the management of this line, and is prospering.

On first arrival at the mines one's first impression is that of their importance. A straggling town of 10,000 or 12,000 inhabitants shelters the Indians

installed on the Huanchaca property. The mine of this name employs about 500 workers, and that of Pulacayo about 3,000, earning from 1 B. 50 to 9 Bs. daily according to class and speciality. Employees and labourers occupy houses belonging to the company, which owns all the land on which the mines and their dependencies are situated ; police stations, telephone offices, and post offices are established at the company's cost. The Huanchaca Company allows no commerce upon its property save in native products ; all imported articles allowed to enter are sold by its agents, so that it unites a large trading enterprise to a great industry.

It is easy to imagine the huge collection of plant involved by the exploitation of so wealthy a mine. The Huanchaca works are connected with the Pulacayo mines by a railway $6\frac{1}{2}$ miles in length, of which three miles runs through tunnels. It is a privileged spot ; for the neighbourhood contains not only water in abundance, but deposits of sea-salt and quantities of peat, selling at about 8d. per cwt., as well as combustible broom or *tola*.

VII. Tradition will have it that the Pulacayo-Huanchaca mine was discovered by the *cateador* (prospector) Ramirez, as a result of the information of an Indian to whom he had rendered some service. In the beginning the development of the mine was gradual. The nature of the grey argentiferous copper ore of which this magnificent lode consists gave rise to the fear that at a certain depth it would be replaced by one of the pyrites, without precious metals, which constituted the base of the ore. The grey copper or complex sulphides of antimony has, in fact, the reputation of being a surface ore, disappearing at a slight depth to become simple pyrites. These fears were not realized, and of late years the lode has been found to persist at a depth of 1,500 feet.

The uniform thickness of the lode is 6 feet, and its wealth in silver about 9 lb. per ton ; but there is a tendency towards concentration in a central column or *clavo* to the detriment of the other portions. This uniform central vein is accompanied by other parallel lodes of inferior wealth ; up to the date of the inundation of which we have spoken the output was 150 tons of ore per diem, containing a total of 1,300 lb. of silver. Before the fall in the price of silver this meant a daily yield of £5,600 or a minimum of £1,440,000 annually. It is therefore not surprising that during this period £400,000 was distributed annually in dividends.

The ores mined from the galleries are first tried out at the surface by women, whose skill is such that certain of them earn as much as 7s. 4d. per diem, although the price paid for tryage is only about 2d. per cwt. All other outdoor and indoor work is admirably executed by means of automatic machinery ; the ore is carried from the mine in railway-wagons, after passing through a series of selective processes, among which is a process of magnetic separation unique in Bolivia.

Let us remark that before the railway was built the engineers of the mine had to treat the ores on the spot. To begin with they installed at Asiento, some thirty miles to the north-east of Pulacayo, where there was a stream capable of yielding a moderate amount of power, an amalgamation works by the hot or *cazo* or cauldron method, invented by Father Barbu in the eighteenth century and perfected by the German chemist Francke. On account of the difficulties of transport to Asiento a factory was built only $2\frac{1}{2}$ miles from Pulacayo, and connected with the mine by means of a tunnel ; there were installed the stamps, chloriding pans, and roasting kilns, as well as the necessary amalgamation vats.

The directors of the mine then resolved to trans-

port the Pulacayo-Huanchaca ores to the Pacific coast, and established at Playa Blanca, three or four miles from Antofagasta, a smelting works including all the improvements which have been introduced in the treatment of silver ore by the metallurgists of the United States.

Owing to the vast expense involved and other factors, the Playa Blanca works were always an unfortunate speculation on the part of the Huanchaca Company. Negotiations took place, and the works were leased to the American Trust of silver smelters, who undertook to buy at a fixed price all ores containing more than 4.4 lb. of silver to the ton, in cases when smelting in America would be more advantageous, while reimbursing the heavy debt with which the works were burdened.

The Huanchaca works, since they have been equipped after the pattern of those at Playa Blanca, are at present competent to treat all ores taken from the mine, since ores containing more than 22 marks of silver are exported directly. Poor ores are enriched, and those containing less than 4.4 lb. to the ton are treated at the Huanchaca foundry, which produces ingots containing 99 per cent. of pure silver.

VIII. The Huanchaca Company energetically attacked the problems raised by the inundation of the mines, an event which had been foreseen, and whose consequences would have been less serious had the administrative board listened to the engineers. While considering whether the drainage of the mines could be accelerated by other means, they sent to England for powerful pumps of the Cornwall type. The pumps worked well and the level of the waters rapidly subsided. Unhappily the amount of coal daily consumed by the pumping engines caused alarm. It was then seen that a swift and abundant stream which lay on the way to Potosi might be utilized.

A suitable installation yielded a power force of over 1,000 h.p. This power was transmitted in the form of electricity to Pulacayo ; the pumps were driven by the current in the first place, and later on the machinery employed for braying and otherwise treating the ores, the compression-machinery for actuating the rock-drills, the ventilating fans, etc.

To-day the Pulacayo mine is completely drained and subsequent inrushes of water have been overcome. The rich vein running through the lode has been recovered, and is yielding 7 and 9 lb. and more per ton. For some time now arrangements have been made for the sale of the argentiferous blendes, which had long been neglected, and cupriferous ores are sold at the same time. The power consumed, which used formerly to cost £8,000 per month, has now for some time, thanks to the system of electric transmission, been obtained for a few pounds per diem.

The price of silver having become more favourable, it is possible that the company will reopen the mines near the old Asiento foundry, and undertake the less productive lodes which surround the Pulacayo mine.

The output of the Huanchaca mines, which was increasing in 1912 (in a single month, that of May, it was 7 tons of silver, 870 tons of blende, and 442 tons of pyrites, valued at £32,920), was sensibly less in 1913 ; for the same month of May it amounted to 3 tons of fine silver, 696 tons of blende, 260 tons of pyrites, valued at £17,740.

IX. After the department of Potosi that of Oruro is considered the first in the matter of the production of silver, thanks to abundant argentiferous formations which have been extensively worked. In this department, not far from the railway, is an isolated peak, rising above the plateau. Rising from the high table-land near the railway is an isolated mountainous

mass, limited in size, but containing many rich mines, some of which belong to Chilian companies, some to English, and others to concessionaires of various nationalities. The exploitation of these mines is excellently carried out. Most of these mines are both silver and tin mines, but it is the tin which is most actively exploited.

Among the silver mines producing silver only in the neighbourhood of Oruro we must cite the Tetilla, the Union Yanqui, Atocha and Itos, Santo Cristo, Jallpa Socavon, Mesa de Plata, etc.

At Oruro, as at Huanchaca, the richest ores are exported ; those of medium and average richness, yielding 2 to 3 per cent. of silver, are treated on the spot in the works at Machacamarca and Obrajés. Two methods of treatment are employed : amalgamation, which involves braying or pulverization, by means of spherical weights instead of stamps or rollers, followed by roasting in a chloriding kiln, and terminated by treatment with mercury and the recovery of the metallic silver by distillation and fusion. The other process employed is that of lixiviation, of which we have already spoken.

These processes are not perfect, for the residues or washings retain about 15 ounces of silver to the ton, as has been remarked. These residues collect in reddish mountainous dumps of no present value. It is the same with the poor ores and the rubbish from the different workings, which are rejected as not worth treatment. One finds these dumps and this refuse everywhere ; the courtyard of the railway station is paved with rejected ores to the depth of a yard ; even the embankments of the railway consist of waste ores containing 15 to 35 ounces to the ton. When coke can be obtained inexpensively over the future Arica-Charana-Oruro railway the limit of utilization of these ores will be lowered. This region, in which the mining industry is already very active,

will undergo a degree of development which will depend very largely on the new freight rates.

An Oruro mine which may have a great future before it is the Tetilla, whose workings, abandoned to-day for lack of capital, are confined to a gallery 800 yards in length. The surface has never been exploited, rich though it is in minerals. This mine was worked down to the year 1895 by a company formed in Paris, by French and Bolivian capitalists, among whom MM. Devés must be named. The error was committed of attempting too much ; the work of the company was confined to the installation of costly offices, manager's house, trying-floors, etc., which absorbed the available capital, while no preparatory work was accomplished and nothing serious effected in the interior of the mine. Once the capital had been expended in unproductive work, and the leading firm, that of MM. Devés, had drawn up their balance-sheet, the works were closed down and so remain.

With good management it would be a simple matter to revive this enterprise. Besides silver the mine contains large deposits of tin, and the mine is untouched on either side of the gallery, where there are rich veins 30 to 60 inches in thickness, yielding an output of 500 to 700 marks of silver per caisson of 5,060 lb. It is estimated that a capital of £32,000 would suffice to reorganize the mine and works and produce immediate profits.

Descending from Oruro to Uyuni by rail, leaving Lake Poopo on the right, we reach the station of Challapata. From this point a road practicable to wheeled vehicles leads to the silver mines of Colquechaca. These mines, which yield sulphides of silver with antimony, were formerly famed for the great abundance of their ores. They are far from being a model of good organization ; they are still in the hands of Bolivians, who have not attempted or have

not understood how to introduce the improvements to be found in the Chilian mines, and in some mines in other parts of Bolivia. From one of the *socavon* of this mine, which is known as San Bartolomeo, in which the great Embudo lode is worked, £2,400,000 of silver was extracted in the space of twenty-six years. In the absence of proper plant, drainage pumps, and proper management these mines have been allowed to become flooded and are now paralysed.

X. As a general thing the output of the Bolivian silver mines, which down to the year 1900 was considerable, has been largely diminished during the last ten years. This fact is due to the low price of silver, bad management, and the mistake of neglecting the veins of silver for those of tin which are found in the same mine.

A tabulation of the output and exportation of the silver mines in Bolivia, from the year 1900 to 1912, enables us to watch the increase of this diminution :—

| Year. | | | | Tons. | Value. £ | Tax Imposed. £ |
|-------|-----|-----|-----|-------|-------------|-------------------|
| 1900 | ... | ... | ... | 411 | 1,203,476 | 33,723 |
| 1901 | ... | ... | ... | 274 | 911,136 | 32,339 |
| 1902 | ... | ... | ... | 253 | 941,523 | 30,093 |
| 1903 | ... | ... | ... | 158·6 | 555,063 | 4,770 |
| 1904 | ... | ... | ... | 97·8 | 308,636 | 2,770 |
| 1905 | ... | ... | ... | 87 | 308,641 | 2,473 |
| 1906 | ... | ... | ... | 108 | 382,940 | 3,064 |
| 1907 | ... | ... | ... | 146·3 | 518,677 | 4,149 |
| 1908 | ... | ... | ... | 154 | 544,184 | 4,362 |
| 1909 | ... | ... | ... | 154 | 644,837 | 4,358 |
| 1910 | ... | ... | ... | 142 | 438,111 | 3,978 |
| 1911 | ... | ... | ... | 127·5 | 367,622 | 3,558 |
| 1912 | ... | ... | ... | 121·7 | 344,824 | — |

During the year 1913 the price of silver oscillated, on the European markets, between £1 16s. 4d. and £1 18s. 11d. per lb.

CHAPTER XIX

THE MINES AND THE MINING INDUSTRY. TIN.

Tin : where found.—II. Table of Bolivian output and exportation.—III. Stanniferous districts ; what lodes are found in each department.—IV. Forms in which tin is found ; thickness of lodes, richness, etc.—V. The chief mines and mining companies of the department of Oruro : El Socavon de la Virgen, San José, Huanuni, El Balcon. The “ King ” of Bolivian tin. Antequera.—VI. Potosi. Uncia and Llallagua.—VII. Stanniferous formations and mines in the department of La Paz. The Huayna-Potosi and Milluni Company.—VIII. Other mining centres. Placer mines.

I. WE have seen that the industry of silver-mining and smelting has undergone a certain decadence in Bolivia. The case has been very different where tin is concerned, for its exploitation and production is steadily increasing. The result is that silver is to-day neglected for tin, which has become the principal article of the Bolivian exports.

The beginnings of tin-mining in Bolivia date only from 1895. Even at that period the metal was not valued in Bolivia ; the Spanish quintal (101 lb.) of barilla, or crushed and concentrated ore, was sold for just under 20s., and the metal was extracted only in small quantities for limited applications. The world's consumption of tin was then sufficiently supplied by the different mining centres, relatively few in number, situated in various parts of the globe. But in Europe the lodes were impoverished, the Cornish mines producing only 4,000 or 5,000 tons

a year, while in Saxony and Bohemia the tin mines were almost completely abandoned.

There are abundant lodes of tin in India, at Perah, Selangor, and Negu ; and in the Malay States and islands, and, above all, in the southern portion of the Malacca peninsula. The mines of Banca and Billiton have been known since 1710 ; and among other mines those of Kotsin, in Yunnan, China, must be mentioned, for there ores are obtained from a depth of half a mile, which under primitive methods of treatment yield nearly 4 per cent. of the world's supply of tin. In the Transvaal a lode of cassiterite discovered in the neighbourhood of Zaaipplaats and Doornhoek has furnished 3 per cent. of the total production. There are other lodes in Africa, particularly in Zululand, the Congo, and the north of British Nigeria, where native tin is found in the form of nodules about the size of a haricot bean, which are recovered after a summary washing.

But of all countries Bolivia to-day possesses the priority in the production of tin where the output of this metal is concerned ; the Bolivian lodes are of exceptional extent and richness, and their number is so great that it will be long indeed before they can be exhausted.

The development of the tin-plate industry and the introduction of tin in the manufacture of white anti-friction alloys, to say nothing of other new applications, and the diminished output of the ancient tin-mining centres, has sent up the price of the metal from £71 per ton in 1898 to £192 in 1912. This remunerative price has been the stimulant which has given life to the stanniferous industry in Bolivia.

At the time of the Spanish domination the mines of Bolivia were worked only for gold, silver, and, in a less degree, copper, but only the very rich lodes were worked. The old Spanish miners rejected the ores of tin as rubbish ; they used them to fill

cavities and crevices and depressions in the soil ; so that modern miners are recovering this debris, and are deriving enormous profits from it ; for instance, in the San José de Oruro mines, where the dump-heaps yield large quantities of tin. In many other localities the dumps or tailings have been worked with success and found to be rich in tin.

II. From mines now working and provided with the means of concentration the output in 1912 was 37,700 tons of barilla, containing 60 per cent. of metal, and valued at £4,789,661. In 1897 the Bolivian output was only 3,749 tons, valued at £238,920.

Since that date the progress has been rapid and constant, as the following table shows :—

| Year. | | Tons. | Value. £ | Duty Paid. £ |
|-------|-----|--------|-------------|-----------------|
| 1898 | ... | 4,318 | 272,400 | — |
| 1899 | ... | 9,111 | 458,476 | — |
| 1900 | ... | 15,957 | 686,361 | — |
| 1901 | ... | 21,528 | 750,457 | — |
| 1902 | ... | 17,395 | 1,247,797 | 32,066 |
| 1903 | ... | 20,559 | 1,556,025 | 36,033 |
| 1904 | ... | 21,164 | 1,365,135 | 37,470 |
| 1905 | ... | 27,200 | 2,100,029 | 48,055 |
| 1906 | ... | 28,854 | 2,819,859 | 125,104 |
| 1907 | ... | 27,188 | 2,391,360 | 112,167 |
| 1908 | ... | 29,408 | 2,474,064 | 74,309 |
| 1909 | ... | 34,937 | 2,532,288 | 88,281 |
| 1910 | ... | 37,866 | 2,960,520 | 116,375 |
| 1911 | ... | 36,341 | 4,211,168 | 181,508 |
| 1912 | ... | 37,700 | 4,789,661 | — |

We may estimate for the year 1913 a possible increase of 15 or 20 per cent. over 1912.

III. Tin, which has become the principal product of the extractive industry in Bolivia, and one of the chief factors of the industrial progress of the Republic, is found in all parts of the country,

from the whole of the eastern portion of the high table-land and the shores of Lake Titicaca to the southern frontier, in thick and unbroken lodes.

The best-known stanniferous districts are four in number: La Paz, in the north; Oruro, in the centre; Chlorolque, in the south; and Potosi, in the east. The best-known district in the north is Milluni, in the Huayna-Potosi; then, going from north to south, the principal lodes are found in Colquiri and the whole province of Inquisivi; near Oruro and its suburbs, the Cerro del Leon and Avicaya; and in the provinces of Poopo, Chayanta, Potosi, Porco, Tazna, Chlorolque, Chacaya, and Cotagaita, a region covering nearly five geographical degrees. The most important portion is included between the 17th and 19th degrees of south latitude.

The most important workings at the present time are the following: In the department of La Paz, the Huayna-Potosi and Milluni mines; in the province of Murillo (Cercado), the mines of Calahuyu, Providencia, and Japajopo; in the province of Loaiza, the mines of Araca, San Andres, Monte Blanco, Mallachuma, and Yaco; and in the province of Inquisivi, the Concordia, Coya, Colquiri, Sayaquiri, Santa Rosa mines, and the workings of the La Paz Mining Company.

In the department of Oruro, which is the most important of all the stanniferous districts, for quite a third of the output comes thence, there is the Socavon de la Virgen and its dependencies; the Morococala, Negro Pabellon, San Salvador, Huanuni, and Japu mines in the province of Cercado¹; and in the province of Poopo the Antequera, Acre, Totoral, San Pablo, Magarinos, and Avicaya mines.

The department of Potosi contains the stanniferous formations of the Cerro Rico and Collahuasi,

¹ Nearly every Bolivian department has a province known as Cercado. It always embraces the suburbs of the capital.



SAN JOSÉ MINE, ORURO.



INDIAN PORTER CARRYING ORE.

in the province of Cercado ; the wonderful Uncia and Llallagua mines, in the province of Bustillos, which are undoubtedly the first in the world for the richness of their ores, the thickness of their lodes, and the quality and persistence of their output ; El Pujro and Maragua, in the province of Chayanta ; Cerrillos, Agua Santa, Carguaycollo, and Tazna, in the province of Porco ; Quechisla, Chlorolque, and Chocaya, in the province of Nor-Chichas ; Pulcaguasi, Oploca, etc., in the province of Sur-Chichas.

The department of Cochabamba, the least exhaustively prospected, contains the mining centres of Colcha, Tucsuhuma, Berenguela, and Jatuncaca, in the province of Arque ; and Cami, in the province of Ayopaya.

IV. In Bolivia tin is found in a state of extreme oxidation—in the form of the dioxide, accompanied with peroxide of iron ; in the form of pure cassiterite (stannic oxide) ; cassiterite with pyrites ; and cassiterite with hydroxide of iron ; more rarely in the form of these latter associated with chalco-pyrites ; cassiterite incorporated with silver ores ; with native silver, antimony, jamesonite, cassiterite associated with wolframite, cornite, magneto-pyrites, arsenical pyrites ; marcasite, chalco-pyrites mixed with native bismuth, etc.

The thickness of the lodes is very variable ; running from a few inches to 10 and in some cases to 15 or 20 feet. Pockets are also found, sometimes 30 to 60 feet in diameter, containing lenticular fragments consisting of 30 to 40 per cent. of tin, or in veins as much as 50, 60, 70, and 100 per cent. Very often pure cassiterite is found, whose yield is never less than 55 per cent. and often attains to 65 per cent. This is sent to Europe as it comes from the mine.

In general the percentage of tin in any ore is very variable, according to the lode ; ores are found

which vary from 2 to 20 per cent. ; perhaps 15 per cent. may be considered an average.

In many mines, and chiefly in those of Potosi and Oruro, lodes which contain tin on the surface are found to contain silver as the workings advance in depth, passing as a rule through a pyritic transition. In others pure cassiterite is found in the form of crystals to a depth of 900 feet (which is the greatest depth so far attained by tin mines in Bolivia). In the Cerro of Potosi veins of tin have been found on the surface, penetrating the mountain parallel with the veins of silver. In many places the veins are united ; and in other lodes tin, silver, and copper alternate or are found in union. Veins of tin ores are also found in groups—that is, in parallel series.

In general tin is most abundant in the upper portion of the lodes, as at Potosi, where it is found right at the summit of the peak, or Oruro, where it is found at the surface. At Potosi the stannic oxide is accompanied by the yellow oxide of antimony, which seems to indicate that these two metals must often have reached the stage of sulphide before being subjected to oxidation. Sulphides of tin are found in the Oruro mines, but oxides are considerably more frequent.

V. The most important tin mines in Bolivia are all situated at an altitude of 9,800 to 17,000 feet above sea-level, and almost exclusively in the departments already named. It would be useless to enumerate them all ; but we will give a few details relating to the principal workings. First, in the department of Oruro, and near the city, the Compañía del Socavon de Oruro owns the old workings of the Chilian company, the Compañía Minera de Oruro, which fell into the hands of the Bank of Chile. This concession consists of 625 acres, distributed among the various heights or cerros : Pié de Gallo,

Rubiales, Itos, Atocha, Santo Tomas, Alacranes, and others, which form the western rampart of the city of Oruro.

The principal workings are those of the Socavon, Atocha, and Itos. The ores taken from these mines are pyrites and *pacos*. The first are silver ores containing tin, and are found at some depth; the *pacos* are metallic oxides containing tin, which are found in the shallower lodes. The works of this company, which employs more than a thousand hands, are entirely of the modern type; the ores are transported to the large works at Machacamarca, some eighteen miles by rail from Oruro, and there undergo the process of concentration. The annual output of the Socavon mine is about 6 tons of silver and 250 tons of tin. The mines of Itos, Atocha, and those of the same group yield about 18,000 tons of barilla, containing 61 per cent. of tin and 12 tons of silver. The famous mine of Itos will soon double its output, thanks to an electrical installation of the latest type, which was expected at the moment of our visit, but was delayed in transit.

The Compañia Minera de San José owns some 210 acres in the range forming the north-western rampart of the city of Oruro, about $2\frac{1}{2}$ miles from the latter. This company, which has an excellent equipment, employs about 500 miners in working a vein whose output is very abundant; its annual yield being over 8 tons of silver and 300 tons of barilla. This mine could double and treble its output if an increase of capital of £8,000 or so were to permit of the installation of better concentration works.

The Penny and Duncan mine owns 426 acres of rich stanniferous soil at Morococala, employing 350 men and yielding an output of some 600 tons of barilla, containing 67 per cent. of metal.

Huanuni is another mine belonging to the same

firm ; 478 acres in the Cercado of Oruro. Harrison & Co. work another side of the same mountain. The total output of these mines, which are in one of the richest mineralogical formations known, is about 1,600 tons of barilla, containing 70 per cent. of tin.

The Compañía Minera El Balcon is an English company working in the Cerro de Pozoconi in the canton of Huanuni ; in its 220 acres it possesses several important lodes. One of the largest mines in the department, the Pozoconi, has lately produced 200 tons of barilla monthly, containing 65 per cent. of tin, which is concentrated in the company's own works at El Balcon. This establishment, and the mines exploited by the English company, as well as the Huanuni group of Messrs. Penny and Duncan, were acquired in 1912 by the Bolivian capitalist Simon J. Patino for the sum of £450,000. Señor Patino, who deserves the title of the Tin King, has given a great impulse to the tin industry in Bolivia. He has undertaken to work his mines by modern methods and to equip them with electric machinery of the latest type.

Another large mining enterprise is the Compañía Estano de Antequera ; it owns a concession of 561 acres, in a region where labour and the means of life are both abundant. The output of this company was lately 30 tons of barilla per month. At the moment of our visit it was proceeding to install an extensive modern equipment, which should enlarge its output.

The Avicaya mines cover 744 acres on the Cerro Chualla-Grande, in the province of Paria, sixty-five miles from Oruro, all but six of which are covered by rail. The works, both under and above ground, are well conducted, the concentration house being one of the best in the country, and the whole installation is capacious and of modern type. The output

is 200 tons a month of barilla, containing 70 per cent. of tin.

VI. In the department of Potosi we note the mines of Soux Hernandez & Co., in the Cerro de Potosi. This firm owns most of the mines in this region. At the present time it is working twelve shafts and employing some 1,200 workers, at daily wages varying from 1 B. to 4 Bs. The company's output in 1911 was 20,000 tons of ore, containing from 5 to 32 per cent. of tin. This company has erected several works for the treatment of ores; the Velarde works, equipped with modern plant, are the most important. Bebin Brothers are another large firm, owning fifteen mines, of which only five are being worked, with 600 workers. The monthly output of the company's mines is 180 tons of barilla, containing 50 per cent. of metal. The ores from this mine are treated in the Huayna and Santa Rosa works, which are as well equipped as those of Soux Hernandez or Aramayo Francke & Co.

The mines of Señors Metting, Calla-Guasi, Eduardo la Iglesia, Cosme, Aluralde, Vladislavichy & Co., and a few more have already a large output and a certain future. Most of the works for the treatment of ores belonging to mines of secondary importance are as yet ill-equipped. The only process employed for the enrichment of tin ores is fusion, whereas in the suburbs of Oruro a tin oxide is produced by other methods which contains 60 per cent. of metal.

The process of smelting as still practised in these mines is extremely primitive. The kilns or ovens are 10 to 13 feet in height; the sole is 12 to 16 inches in width, and the air is introduced by two blowers worked by a small hydraulic wheel. With the exception of the works already specified, the only establishment which has introduced any improvements on this primitive system, which loses

quantities of tin, is that of La Riva & Co. at Trinidad, where a bronze turbine, manufactured in Bolivia, is used.

The most noted mines in the department of Potosi are at present those of Uncia and Llallagua, in the province of Bustillo, fifteen miles from the Antofagasta Railway; they yield a rich ore, which is exported after washing.

At Uncia the Tin King, Señor Patino, owns the great Salvadora mine, which is marvellously rich. The ores, transported by electric cableways, are treated in the Miraflores concentrating works, one of the best equipped in Bolivia. The works are subjected to the most recent rules of the mining industry, and the whole installation (houses, hospital, school, etc.) is equally well designed. The monthly output of the Salvadora mine is about 800 tons of barilla, containing 65 per cent. of tin.

The Compañía Minera of Uncia exploits a concession consisting of various groups of mines (305 acres), in which there are a number of important lodes, varying from 20 inches to 10 feet in thickness, the ores containing 0 to 60 per cent. of tin. The Animas and San Miguel mines are those most actively worked. These two mines, which employ 600 workers, yield an annual output of 1,800 tons of barilla, containing 67 per cent. of tin, which is treated in the Victoria works, which are about to be transformed.

The mines of the Uncia Mining Company, which used to be the property of an Irish company, have been purchased for £150,000 by Señor Patino, who has thus amalgamated into one enterprise the two principal mining companies of Uncia. This gentleman, who is well on the way to becoming the largest producer of tin in the world, hopes to make the two groups of mines produce a monthly output of 1,300 tons of barilla, containing 67 per cent. of tin.

To the east of the village of Uncia there are still many lodes of tin which only await capital to yield a large output and heavy dividends.

We must not overlook the important mining district of Llallagua, which in the matter of geological formations resembles the Uncia district. We will instance only the *Compañía Estanifera de Llallagua*, an undertaking initiated by Bolivian and Chilian investors (the office being at Santiago); the concession covers 525 acres, and the principal workings are those of the *Socavon Azul*, in which the ore is extracted from two different veins. The installation is absolutely up-to-date; the company employs electric traction and has wagons running into the galleries. The ores are transported to the concentration works by a cableway three miles in length. The present output is about 700 tons annually, with 600 workers. After a crisis, due to bad management, these mines have lately increased their output.

VII. The department of La Paz also contains a certain number of tin mines. Among them we must mention the tin and bismuth mines of *Huayna-Potosi* and *Milluni*.

These mines, which are now worked by a French company, whose headquarters are in Paris, are some twelve miles out to the north of La Paz, and are connected with the city by a bad cart-track. This company owns 1,620 acres, divided into two tracts, the one known as *Milluni*, in the valley of the *Rio Milluni*, and the other, distant about four miles as the crow flies, as *Huayna-Potosi*, in the *Santa Rosa*, *Charquini*, and *Churumani* Mountains, in the valley of the *Rio Chunaui*. The journey from La Paz to these mines is mostly accomplished by mule-paths, *Milluni* being seven hours distant and *Huayna-Potosi* about the same, while from *Milluni* to *Santa Rosa* is two hours. Sometimes the track clings to the

side of the mountains, sometimes it scales the spurs and reaches an altitude of 16,000 feet.

The whole region in which these mines lie was formerly explored and exploited by the Spaniards, but they troubled little about tin, prospecting rather for gold and silver. Abandoned after the exhaustion of the silver-bearing lodes, these mines were reopened some twenty-five years ago with a view to extracting the bismuth, in which the detritus was extremely rich.

Owing to the fall in the price of bismuth on the European markets these mines were once more about to be abandoned, when it was, fortunately, discovered that the dump-heaps resulting from the extraction of bismuth, as well as those of the old Spanish mines, were simply composed of tin ores. This discovery led to the revival of the Huayna-Potosi lodes, and work was at once commenced, principally on the old dump-heaps or *desmontes*.

Señor Angel Caballero, then owner of the mine, also undertook the extraction of the virgin mineral, but he had recourse to the contract system, and as the contractors had as a rule but very little capital they had to confine themselves to surface workings. As, moreover, only the rich ores were to be exploited—that is, ores giving some 30 per cent. of tin without mechanical treatment, after being merely tried out by hand—the miners confined themselves entirely to the exploitation of pockets which yielded ores of this quality. The mine, in short, was badly mishandled.

At this moment the firm of Devés intervened, bought the mine, and installed, for the rational treatment of the ores of the Huayna-Potosi, at San Eduardo and La Union, mechanical washers, consisting of jiggers and the tables known as *frue-vanners*, which make little waste and answer their purpose excellently.

Shortly afterwards a French limited company purchased the mine and remains in possession.

The mines of Huayna-Potosi consist of two systems of lodes, of which the one is more particularly argentiferous. These lodes are those which were formerly exploited by the Spaniards with such good results. To-day they are no longer worked ; but a recent examination leads to the supposition that they are accompanied by a stanniferous vein, which probably lies along the roof of the lode ; its richness would appear to be very variable and its mineralization exceedingly complex ; it contains, in fact, not only tin, but nickel, bismuth, cobalt, and even, in certain veins, yttrium and tantalum.

The other lodes are more particularly stanniferous, but they also contain bismuth ; their thickness varies from 27 to 60 inches, but is 40 feet in the Carmen section. This extraordinary thickness makes it necessary to work the lode in steps, commencing at the top, and making up the ground by means of earth brought from the surface. Another section, the Aurora, is still exploited by means of a great open trench.

The richness of the ores in tin varies from 2 or 3 to 30 and 40 per cent. The Union works are able to treat 100 tons of ore in the twenty-four hours. The motive force employed is furnished by two Pelton wheels, which also work a dynamo which furnishes current for lighting the works and the office buildings.

The Milluni deposits are quite unlike those of Huayna-Potosi ; the formation is definitely a system of veins. One of the veins (the Rothschild), which lies along the surface, has been exploited by excavation for nearly three miles ; it was extremely rich in tin, but the richness seems to diminish in proportion to the depth ; and at a depth of 160 to 190 feet below the surface the content is replaced

by carbonate of iron. At Milluni the Ailloco and Salvadora veins are the most exploited ; they are worked at different levels by a dozen adits, all of which have produced a stannic ore. The cassiterites in these veins are crystallized, and the complete freedom from pyrites renders their treatment very much simpler than at Huayna-Potosi.

To give vitality to the mine, and, above all, to draw some profit from the numerous small veins existing in the old workings, the management has organized a service of *pirquineros*, who prospect for the small rich veins and layers which have been left untouched in the old workings, and treat the ores extracted themselves by means of what is known as the German caisson. The company pays them so much for every quintal of barilla furnished, the tariff being in proportion to the richness of the barilla in tin. This system yields the company a handsome profit.

The output of the Huayna-Potosi Company is some 50 tons per month of ore, containing 60 per cent. of tin, of a minimum value of £3,000, without counting the bismuth produced. It employs 250 workers, paid 1 B. to 4 Bs. daily ; the company lodging all workers rent-free on account of the remoteness of the mines from inhabited centres. It has been obliged to open stores, from which advances in kind are made daily to the staff. The ores from the mines are sent to Havre ; and in order to realize a profit on the bismuth contained in the barilla the company has installed a foundry at Rouen, where the bismuth is extracted and the tin run into ingots.

VIII. We will cite without description, as that would demand too much space, certain other of the mining centres of the department of La Paz. The Monte Blanco mines lie near lakes which would yield a force of 1,200 h.p. Then come the mines of the Compañia Minera of Colquiri ; the Harrison

and Bottiger mines at Kala-uyu ; the mines of the La Paz Mining Company, Ltd., etc. We must not omit the Araca and Quimza Cruz mines, which have a great future before them ; they lie between La Paz and Oruro, and the lodes run across three provinces : Sicasica, Loaiza, and Inquisivi. The Araca group is connected with La Paz and the other with Oruro. In the Cordillera of Quimza Cruz (the Three Crosses) are the Mallachuma and Empresa Encarnación mines, etc.

In the Cerro de Pococho of this Cordillera a number of concessions have been granted to persons who have no capital at their disposal. It should be easy for foreign capitalists to unite these concessions, forming one or more enterprises which would be certain of success.

On the slopes of the Huayna-Potosi mountain and extending over the high table-land over an area of 2,500 acres are in the placer-mines of Japajopo, which are rich in tin. These placers, besides tin, contain gold in flakes, bismuth, native and in the form of sulphides, and oxide of iron. In the absence of capital, the works are limited and imperfect. An investment of £15,000 or £16,000 would secure a great future for these deposits.

Other placer-mines, containing tin and gold and bismuth, are the placers of San Francisco and Concepción, which are situated in the province of Omasuyos and the canton of Pucarani. Here a concession of 630 acres belongs to MM. Bertin Brothers and Posnansky. The width of these placers varies from 6 to 100 feet, the mineral containing 70 per cent. of tin, and bismuth is found in flakes, containing 98 per cent. of pure bismuth.

In all the localities indicated there are many more mines, some exploited empirically on a small scale with variable results, while others are only experimental workings ; but most of the concessions, being

held without capital or merely for speculative purposes, are simply retained by the payment of the patent dues, despite the undeniable wealth of the majority. Other lodes are discovered daily or remain to be discovered ; sooner or later all will be exploited, but even to-day we can affirm that Bolivia is quite equal to supplying the whole world with tin. The wealth of the Bolivian deposits is well known ; all that is needed is capital to exploit the mines.

The tin industry only needs capital to attain a still greater development ; and the task of capital will be greatly facilitated by the creation of roads and railways. These improvements are on their way, for the cultivated Bolivian is wearying of tradition and traditional methods ; we see this in the daily improvements of the means and methods of production, the endeavour to improve the extraction of ores, to obviate losses in trying out, and to employ the best machinery obtainable.

Let us finally remark that Bolivian tin, which barely paid the cost of production with prices at £60 or £70 per ton, becomes highly profitable when London¹ and New York prices reach £192, as they did in 1911 and 1912. It is easy to comprehend that under these circumstances the exportation of tin from Bolivia is constantly increasing, as we saw in the beginning of this chapter.

¹ Among the great consumers of tin is England, which absorbs nearly 98 per cent. of the total output, owing to the development of the tin-plate trade, which is localized in Cornwall and South Wales.

CHAPTER XX

THE MINES AND THE MINING INDUSTRY. VARIOUS OTHER ORES

- I. Copper. Cupriferous formations. The mines of Corocoro.—
- II. Some details as to these mines : methods of exploitation.—
- III. The principal mines. Table of production and exportation of copper between 1900 and 1912.—
- IV. Bismuth : its exploitation and production.—
- V. Antimony, zinc, and wolfram.—
- VI. Coal and lignite : petroleum.—
- VII. Mining laws. How to acquire a mine. The prospector's tax.—
- VIII. Export duties imposed on various metals ; gold, silver, and tin.—
- IX. Export duties on copper and bismuth. Other duties or taxes.—
- X. Criticism of the mining laws ; obstacles to the development of the mining industry.—
- XI. The real meaning of the complaints made and the underlying motive of dispute.—
- XII. How to avoid lawsuits. The creation of technical commissions.—
- XIII. A few details as to the opening of a tin mine.—
- XIV. The cost of installation, provisional and final. Other considerations.

I. OF all the mineralogical treasures contained in the Bolivian subsoil, copper is one of the most important in the abundance, quality, and thickness of the deposits which offer themselves to industrial exploitation.

The cupriferous formations found in Bolivia are extremely extensive ; in their principal ramifications they follow the course of the eastern chain of the Andes. They are found uninterruptedly from Lipez, where white copper is found, to Porco and Chayanta in the department of Potosi ; they appear in the provinces of Arque and Colchas, in the department of

Cochabamba, and running past Turco, Poopo, and Oruro, they take a north-easterly direction as far as Corocoro and Atacama, passing by Chacarilla. From Corocoro the formation extends through the provinces of Omasuyos, Muñecas, and Caupolican in the department of La Paz, and ends in the nucleus known as Apolobamba, near the union of the two Cordilleras.

Besides this vast main formation, veins have been discovered in all the buttresses of the Andes and as far as the departments of Chuquisaca and Tarija.

Copper is found in Bolivia principally in the native state. The Corocoro deposits are famed above the rest. These are beds of reddish sandstone, probably of Silurian origin, which are impregnated with native copper in powder and sometimes even in plates or nodules. This native copper in the form of powder is employed in the preparation of cupric sulphate; it is roasted in a kiln before exposure to sulphuric acid. The Corocoro mines, whose present development is due to the more remunerative price which the metal has recently attained, will be even more actively exploited when the Arica-La Paz railway from Arica to La Paz provides them with new facilities of transport.

The Corocoro mines have been known from the remotest periods. They were abandoned for a time owing to the low price of copper and the difficulty of exporting the output, which had to be sent in carts or on the backs of mules or llamas to Arica, or at least as far as the Rio Desaguadero; ascending this river and making the costly passage of Lake Titicaca the products reached the Puno-Mollendo railway. The Arica railway greatly simplifies the situation, and will effect a great economy, thereby giving an impulse to an enterprise which has by no means reached its maximum.

II. At Corocoro two distinct formations are recognized; one, designated the *veta* (that is, vein), was



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the first to be known ; it consists principally of yellow or red arseniates ; it extends with great uniformity from north to west for a distance of several miles, and is more than 1,000 yards in depth. These veins contain no gangue of gypsum, but are composed essentially of rounded fragments of quartzite, often the size of a walnut, which sometimes form a conglomerate. The other formation, known as *ramos* (branch formation), lies above the other, surrounds it to the south, west, and east, and occupies a great part of the valley of the Desaguadero. It consists also of arseniates like those of the *vetas*, but darker in colour, being of a brown or chocolate hue, and is distinguished by a clayey gangue containing an admixture of gypsum. In the east this last formation extends for six miles with a thickness of over 2,000 yards ; in the south it runs as far as Chacarilla, thirty-five miles from Corocoro, and there divides, branching to the south and east.

Besides these arsenical, argillaceous, and gypsous formations there are deposits with a gangue of tufa and a conglomerate of trachyte.

The form in which the copper commonly occurs is that of small irregular grains, spongy, known as *barilla*, containing 70 to 80 per cent. and sometimes as much as 92 per cent. of copper. Native copper, which forms the great wealth of these mines, is found in different forms, from microscopic grains to the great masses known as *charquis*. These *charquis* are found in considerable quantities at La Chacarilla, where large plates of copper are found $3\frac{1}{2}$ inches in thickness. Ores containing only 15 or 20 per cent. of copper are usually neglected.

Owing to the absence of good kilns or foundries these mines are only exploited for *barilla*, and the cost of production of a quintal of *barilla* (220 lb.) containing 80 per cent. of copper is on an average 12s. to 16s.

As we have stated, the majority of these mines have been abandoned with the exception of those of Corocoro, which furnish the greater part of the Bolivian output.

The exploitation of these mines is not everywhere conducted in an equally scientific manner. The shafts and galleries are fairly regular in plan, with rails of wood or iron for the removal of ores ; but the manner of working is not systematic, and the best means of assuring the complete and easy extraction of the metal seem unknown. Extractors are worked by mules except in a few mines where steam is employed. There are a few badly constructed roasting furnaces which occasion considerable loss. The mechanical preparation of the ores is equally rudimentary. On leaving the mine the ore is handled by women, who break it roughly with hammers to separate the rich fragments from the poorer stuff ; these women are paid about $7\frac{1}{2}$ d. a day. Then the ore is brayed in crushing houses or *moliendas* by means of the *quimbalete* or *trapiche*. The former consists of a mass of diorite some 28 inches in height and in shape like a truncated pyramid 16 to 20 inches square, which rests upon other masses of diorite so arranged as to form a shallow well. To the upper portion of the first stone is firmly affixed a wooden lever. The ore is placed between the two stones, a current of water is directed over it, and by means of a continual rocking movement a workman brays the ore, the waste portions of which are carried away by the water. There are ranks of ten to twenty of these *quimbaletes*, each of which is worked by a labourer, who concentrates the ore until it contains 70 per cent. of copper, for which he is paid 3s. 2d. per quintal (220 lb.) of barilla. Each *quimbalete* can bray some 28 quintals of ore per week.

The *trapiches* are formed each of a circular stone of diorite some six feet in diameter and eighteen

inches thick. The stone is called the *voladora*, and revolves at the rate of 110 revolutions per minute upon a bronze sole $3\frac{1}{2}$ inches thick, which rests on a solid foundation. The movement is transmitted by means of bevel gearing, which is of gun-metal.

A *trapiche* is composed of the following pieces :—

| Pieces. | Weight. Tons. | Cost. £ |
|------------------------------|------------------|------------|
| Voladora | 3 to 4 | 80 |
| Tire | $2\frac{1}{2}$ | 80 |
| Sole | $3\frac{1}{2}$ | 112 |
| Bevel gear-wheels (each) ... | 4 | 128 |

The sole and tire last about two years. The *trapiche* is usually actuated by a hydraulic wheel, usually a wooden wheel about thirteen feet in diameter, which works twelve hours a day. The *trapiche* will bray 135 tons of ore per week. The finer particles—known as volatile copper—are carried off by water and sink by gravitation in a well or vat ; the larger particles are brayed twice, the final product being known as *charquicita*, consisting of copper mingled with a certain proportion of impurities—the proportion of pure copper being 90 per cent.

Each *trapiche* requires two men to operate it ; one charges it with the crude ore and the other moves the ore under the wheel. Their wages are respectively $11\frac{1}{2}$ d. to 1s. $1\frac{1}{2}$ d. per diem. The ore brayed in the *trapiche* and *quimbaleta* then goes to the washing-machine, which yields a product containing 90 per cent. of copper. The men in charge of the washing process are paid $9\frac{1}{2}$ d. per diem, and wash 220 lb. of barilla daily.

The residue of this washing process passes through a second washing ; this process yields about 75 lb. a week of barilla containing 75 to 80 per cent. of copper. The workers are paid 3s. 10d. per 220 lb. of barilla.

The barilla is then dried in the sun on a drying-

floor, a workman continually turning it over with his feet. In times of rain it is dried on a sheet-iron table which is heated by a small fire of *taquia* (llamadung), the chief fuel of the district. An assay is then made, after which the barilla is packed in sacks, each of which is marked with the percentage of copper contained.

III. The Compañia Corocoro was founded in 1873 with a capital of £80,200. It owns 870 acres, divided into fifteen groups of mines, among which the Remedios and Segunda Seccion are the most actively worked. The ores are treated in the San Francisco works, which have been reorganized; the workers both above and below ground are readily recruited from the small Indian city of Corocoro, which lies at an altitude of 13,200 feet, in the midst of the mining centre. The monthly output of these mines is about 380 tons.

Another large syndicate exploiting the mines of this district is the Corocoro United Copper Mines Company, whose concession consists of 1,325 acres, divided into nineteen sections. The principal workings are the Huallatiri, Santa Rosa, Viscachani, Toledo, and Quilinquilis mines. The syndicate appears to be flourishing.

There are a few other small mines whose output is insignificant. Despite the great number of concessions granted in the various cupriferous belts of the department of La Paz, Oruro, and Potosi, the province of Corocoro is the only locality where copper is worked continuously; the other mines are practically abandoned owing to the lack of capital and means of transport.

The table given on the next page records the approximate quantity and value of copper produced and exported between the years 1900 and 1912.

To the output for the latter year we must add 370 tons of ore not treated, valued at £2,563.

IV. Bolivia has acquired a certain fame as a bismuth-producing country, occupying in fact the first place among the three leading countries. Bismuth, which might be employed as a component of many useful alloys, has been utilized almost solely by the pharmacist, owing to the high price which a combination of commercial factors has maintained. The ores of bismuth—arsenical sulphates and carbonates and oxides—are so abundant in Bolivia that the metal might be sold for 7d. to 10d. per lb. and yield the producer a handsome profit.

The region in which bismuth occurs in Bolivia, as an ore commonly mixed with others but readily

COPPER PRODUCED AND EXPORTED.

| Year. | | | | Quantity. Tons | Value. £ | Export Duty. £ |
|-------|-----|-----|-----|-------------------|-------------|-------------------|
| 1900 | ... | ... | ... | 2,450 | 82,074 | 4,340 |
| 1901 | ... | ... | ... | 2,535 | 89,007 | 4,487 |
| 1902 | ... | ... | ... | 3,626 | 164,760 | 6,414 |
| 1903 | ... | ... | ... | 3,895 | 159,105 | 6,806 |
| 1904 | ... | ... | ... | 3,142 | 128,687 | 5,841 |
| 1905 | ... | ... | ... | 4,471 | 200,301 | 7,917 |
| 1906 | ... | ... | ... | 4,160 | 265,351 | 7,560 |
| 1907 | ... | ... | ... | 3,408 | 205,039 | 6,009 |
| 1908 | ... | ... | ... | 2,974 | 137,922 | 4,941 |
| 1909 | ... | ... | ... | 3,029 | 141,334 | 6,137 |
| 1910 | ... | ... | ... | 3,155 | 142,956 | 3,139 |
| 1911 | ... | ... | ... | 3,148 | 95,373 | 2,873 |
| 1912 | ... | ... | ... | 4,958 | 269,647 | — |

separated from them, is contained in the departments of La Paz and Potosi. Without speaking of native bismuth, which has been found in the neighbourhood of La Paz, in the mines of Huayna-Potosi, an important lode of arsenio-sulphide of bismuth, more or less decomposed in the outcrops, has been discovered at Chlorolque in the tin mine belonging to Señors Aramayo.

The Señors Aramayo were persuaded of the value of bismuth by their chemist, Francke, who had become their partner. He installed a furnace in

which the ore was reduced or reacted upon by metallic iron. The output of bismuth which Francke was about to sell in Europe might, by its importance, have depressed the price of the metal had not a trust been formed by the royal foundries of Saxony, the Australian mines, and those of Bolivia. The King of Saxony had practically the monopoly of the metal, and by controlling the Bolivian output he evaded competition. For this reason bismuth did not undergo any great variation, and for many years it has been maintained at a price of £732 per metric ton.

Noting the success of the Aramayo brothers, the Bolivian Government hastened to charge the production of metallic bismuth with an export duty of 70s. per ton, which was a trifle in the case of a metal selling for £600 to £1,200 per ton, according to the market, and which cost no more to produce than lead.

Between 1904 and 1909 119,230 tons of bismuth, valued at £563,792, or an annual average of 1,997 tons, valued at £93,965. In 1910 the exportation amounted to 305 tons, valued at £153,873. In 1911 it was 408 tons, valued at £168,493, and in 1912 the figures were 375 and £161,271.

V. There are in Bolivia sulphides of antimony in very large quantities. When metallic antimony is worth no more than £56 to £64 per ton the sulphides of antimony are not exploited or exported, but this does not apply to auriferous compounds of antimony. There are sulphides of antimony which contain as much as 1,200 grains of gold to the ton, having a compact steel-grey fracture. This association of gold and antimony is very natural, having regard to the chemical assimilation of the sulphides of gold and antimony, which are equally soluble in alkaline sulphates; and this similitude of chemical properties should serve as the basis of the treatment of the

auriferous ores of antimony which abound in this region.

In 1910 the exportation of antimony amounted to 515 tons, valued at £7,766; in 1911 to 311 tons, valued at £5,473; but in 1912 these figures fell to 89 tons and £410.

In a country in which coal is at present practically unobtainable, while charcoal is comparatively dear, the establishment of the zinc-smelting industry must have presented many difficulties; however, the exportation of this metal is sensibly increasing.

Zinc is found in great abundance in the form of sulphides or blende. Blendes rich in silver, like those of the Pulacayo-Huanchaca mines, are best sent to Europe and freed of silver before the zinc is extracted.

In 1910 the exportation of zinc from Bolivia was 11,686 tons, and its official value £34,800. For 1911 and 1912 these figures were 9,624 tons and £29,799 and 8,850 tons and £28,978.

Wolfram has been found in Bolivia of late years. In this country it is nearly always found near veins of tin. Wolfram, which occurs in the state of tungstate of iron, is found at Caluyo, in the province of Inquisivi, and Yanacachi, in the province of Sur-Yungas. Oruro also possesses deposits of wolfram at Conde-Aqui, Cochabamba at Ayopaya, and Potosi at Chlorolque, Chocaya, and Tazna.

The ore is always the ordinary wolframite, although pure ferruginous wolframite is also found. The wolframites are always mixed with quartz, and are frequently accompanied by arsenical pyrites and more rarely by native bismuth. The wolfram of the Chlorolque and Tazna mines is mixed with the ores of bismuth, silver, tin, and copper. The average richness varies between 5 and 20 per cent. of tungstic acid, the ores concentrated for export containing 60 to 70 per cent. of acid.

This comparatively new industry has been affected by the enormous and rapid fluctuations of the European market, which have alarmed a number of small concession-holders. There are at present about thirty small mines exporting wolfram situated in different mining districts. Messrs. Aramayo, Francke & Co. own the largest of these mines, covering 8,764 acres, and containing lodes of tin, wolfram, bismuth, and silver. The annual output of wolfram is 1,800 quintals of barilla containing 60 per cent. of acid.

We may also mention the mines of Messrs. Cordova, in the Turqui district near Potosi; the Poderosa mines, owned by A. Fricke & Co., whose lodes contain not less than 50 per cent. of tungstic acid. These mines, which cover an area of 525 acres and yield excellent results, are in the province of Inquisivi and the canton of Caluyo.

The exportation of wolfram in the form of barilla is increasing; in 1910 it amounted to 210 tons, valued at £11,330; in 1911 to 294 tons, valued at £18,495; and in 1912 to 465 tons, valued at £23,619.

VI. Among the other products of the Bolivian sub-soil we will mention only coal and petroleum. The former is rather a lignite of fair quality, which has been discovered at Yampupate in the peninsula of Copacabana. The concessionaires of these seams have experimented with their product in the Pura-pura works of the Guaqui and La Paz railway. These shops worked seven hours with lignite, of which they consumed 1,026 tons, giving an electric current of 340 amperes. If the lignite had been separated from the schist which accompanied it the consumption would have been less and the current larger. Despite certain reports we do not think that these beds have yet been seriously exploited.

On the hacienda (rural estate) of Quilcoma, near

the Ayoapo railway station, other important seams have been discovered and appear likely to give good results. A company is being organized to exploit this industry, which should have a great future before it. We have also seen excellent samples from the neighbourhood of Tacora, near the frontier, on the Arica railway, where there are mines owned by M. Mariano Miloesvich. From an inquiry made by a commission of engineers it seems that this coal would equal that of the Coronel mines in Chile ; the seams are thick and rich in coal, and might well supply all Bolivia and the north of Chile.

Petroleum has been discovered at various points in very abundant deposits, principally in the departments of Chuquisaca, Santa Cruz, and La Paz. At Sucre a company has been formed to work the oil-fields of the department of Azero. In Santa Cruz, the most favoured of the departments in this respect, numerous deposits of petroleum of good quality have been found, and there is also a deposit at Pacajes in Calcota.

It will be seen from the foregoing chapters that there is no lack of natural wealth in Bolivia. It abounds ; it only waits for those who can and will exploit it. With increased means of communication—and their rate of development is remarkable—such persons will be more numerous and better able to pursue their aim. The mining industry, so flourishing during the period of the Spanish domination, and whose resurrection has already become a fact, is only awaiting the financial and technical co-operation of European capitalists and engineers to undergo a remarkable and most productive development.

VII. The mining laws of Bolivia, which are perhaps too liberal, containing imperfections and lacunæ which should now be remedied, have often been keenly criticized. It may be useful here to remark on some of their most important dispositions.

The Bolivian Mining Law of the 13th of October, 1880, is based on that of Spain of the 29th of December, 1868 ; but of late years certain modifications have been introduced. This law, like the mining law of other States, attributes originally to the State all property in metalliferous formations, and those of such inorganic substances as borax, sal ammoniac, magnesia, alumina, sulphur, coal, peat, asphalt, petroleum, etc.

This law establishes that any person in enjoyment of his civil rights may obtain one or several *pertenencias*, or claims, as a single concession, in known mining centres, or as many as thirty claims in newly discovered deposits. The claims which together form a concession must be grouped in an unbroken series. The *pertenencia*, or claim, is the unit of area in such concessions ; it is a solid with a base of 100 metres square measured horizontally in the direction denoted by the applicant, and of indefinite depth.

Auriferous or stanniferous or other metalliferous sands found in rivers, placers, etc., on public or private lands are conceded under the same conditions as other claims.

The detritus, scorizæ, and tailings of abandoned mines or smelting-works which are discovered on lands not yet enclosed will be adjudged to the first who desires to work them, and will be considered vacant when they have remained unexploited for six months.

Concessions are in perpetuity, on condition of the payment of 4 Bolivians (6s. 5d.) per claim or per hectare per annum. Applications must be made before the prefect of the department.

In the case of the Cerros of Potosi, Machacamarca, and others now being worked, where the *pertenencia* cannot be constituted conformably with Article 21 of the law, on account of the existence of superimposed claims, the patent will be granted

for a payment of 4 Bolivians for each mine-shaft, excepting shafts serving only for lighting or ventilating purposes.

This patent is payable every six months in advance, dating from the date of concession. The claims are regarded as abandoned when no payment has been made for the space of a year, and if after application payment is not made within a fortnight. A miner wishing to relinquish a claim must give notice to the authorities ; and only after so doing is he released from the necessity of payment.

The law of 25th of November, 1911, exempts from payment for five years, from January 1, 1912, all concessions to mine peat, petroleum, coal, lignite, naphtha, and sulphur.

It is permitted to all responsible persons to prospect and to make excavations, without previous authorization, but after having given notice to the authorities, in all public and private domains which are not enclosed land. In enclosed lands the authorization of the owner is indispensable, or in default of this a judicial licence, indemnity being paid if occasion arises. These preliminary works must not exceed 10 metres in length or depth.

According to Article 17 of the decree of January, 1872, mines of precious stones cannot be conceded, but their exploitation must rest with the State. Any person discovering mines of this kind will have the right to claim a pecuniary reward, which will be paid after an expert report as to the nature of the discovery.

VIII. Export duties are declared on the principal metals and concentrated ores on the following scale :

The first article of the law of 1902 declares that ores and concentrations of silver mined in Bolivia are free of export duty, but by Article 2 any exporter of such products must obtain from the local

custom-house a pass on which the weight, richness, and destination of the ores are recorded. For each mark (230 grammes) of silver contained in exported ores he will be taxed only 8 centavos (about 1½d.) as a registration duty.

By Article 4 of the same law mining enterprises, smelting-houses, or dealers in metallic silver will pay 6 per cent. of their net profits, according to their half-yearly balance. Enterprises dealing in other metals pay 3 per cent.

The export duties on tin and ores of tin, fixed by the law of the 18th of November, 1912, are estimated according to the price fetched in the London market for Malacca tin. Barilla (the concentrated ore) will pay 2 Bolivians (3s. 2d.) per quintal if quoted at less than £100 per ton. Between £100 and £300 the duty is raised by 65 centavos (1s. 0½d.) per fraction of £10. Above £300 barilla will pay 15 Bs. 20 per quintal.

Bar tin, if quoted at £100, will pay 3 Bs. 25, with an increase of 87 centavos per £10 increase up to £300. Above that price the duty is 20 Bs. 92 centavos per quintal.

IX. According to the same law the export duty on copper, payable in proportion to the quality of the product and its value as quoted in Europe on the day it is despatched, is charged as follows :

When the price of copper does not exceed £50 per ton the duty on bars, ingots, and impure coppers will be 1 B. 20. With the price between £51 and £100 an additional 30 centavos is paid for every fractional increase of £10. Above £100 the duty is 3 Bs. 30 per quintal.

The export duty on barilla or concentrated copper ores is 70 per cent. of the above duties.

Untreated or unconcentrated ores of copper are allowed a rebate of 75 per cent. on the tariff for bar copper.

The export duties on bismuth, in bars, ingots, or other metallic forms, progress by augmentations of 50 centavos per increase of £10 when the price of the ton exceeds £230, at which price it pays 10 Bs. Above £400 the duty increases by 1 B. 50 for each of the first three fractions of £10 and by 2 Bs. 50 for further increases. At £1,000 the duty would be 50 Bs. 50 per quintal.

Barilla or concentrated ore of bismuth pays the same duty, with a rebate of 30 per cent., and unconcentrated ores are allowed a rebate of 50 per cent.

In addition to these duties the law of the 22nd of January, 1910, established a duty of 1 in 1,000 ad valorem on the exportation of all classes of minerals.

The law of the 7th of February, 1911, imposed a tax of 1 per cent. on the transfer of the title to mining properties and rubber plantations.

Wolfram pays 1 B. duty when the value of this product does not exceed 25s., with an increase of 50 centavos per fraction of 10s. up to 40s.

Finally, the law of the 1st of December, 1911, imposed a tax of 3 per cent. on the net profits realized by mining enterprises constituted as private or limited companies. This tax is payable on the half-yearly balance-sheet. This latter clause having evoked protests from mining companies, who reasonably objected to the difficulties and the loss of time occasioned by such frequent inventories, it is probable that Congress will decide that the tax may be paid on the annual balance-sheet.

There are no export duties on gold, which pays merely a registration duty of 20 centavos per ounce. It is the same with all other minerals not mentioned here.

X. The laws which regulate and protect the mining industry in Bolivia are as good as those of other countries, but the same cannot be said of their

application. As we have said, there are many hundreds of applications for claims made annually, but very few concessionaires undertake work upon the claims conceded; they confine themselves to paying the legal dues, and, with their hands in their pockets, they wait for the company or syndicate which shall pay a round sum for the mere fact of having taken the pains to make an application and pay the dues of the survey charges.

But hard as it may sometimes be, the purchase of these titles, when their value is genuine, is no serious obstacle to the development of mining ventures. The obstacle is of quite another kind. It consists in the fact of opposition; until lately the applicant who succeeded in overcoming administrative delays and obtaining his titles to his property without difficulty or opposition might consider himself exceedingly fortunate. In too many cases hardly is an application made and the fact published than it meets with all kinds of opposition. In the case of old mines or mines worked superficially there will probably be titles or ancient powers in the hands of old residents, titles carefully and anxiously preserved as family heirlooms against the hour when some foreigner shall undertake to exploit the mine in question. Others had grandfathers who made application for claims in the same spot; by inheritance priority is due to them; another has a relative in whose name he intervenes, who asserts the caducity of another similar or adjacent mine; a fourth has obtained a concession in the same region.

However absurd and unfounded such opposition may be, it has to be forwarded, and the pleas, having made their way through the office of the mining notary, the prefect, the procurator, etc., finally reach the applicant, who cannot always obtain a provisional judgment against the objectors; in which case there

is a right of appeal to the Government. These difficulties and delays have discouraged many timid investors, who did not foresee such difficulties, although they occur more or less in all Spanish-American countries. The great majority of objectors have no other aim than that of obtaining as large a payment as possible from the applicant when the latter is wearied by the cost and procrastination of legal procedure.

To avoid spurious opposition whose only object is to derive personal profit the objector who cannot prove his pretensions should be severely punished. Such opposition has done the country irreparable damage by exhausting the patience and energy of capitalists.

XI. As we shall presently explain, certain measures have been taken in order to make it easier to obtain concessions ; but we must remark at the outset that if the criticisms and complaints which both Bolivians and foreigners are wont to make in respect of the lack of guarantees in the mining district, and the numerous lawsuits to which property gives rise, are in general justified, the fault is more often than not that of those who are the victims of these troubles.

As numerous competent persons have remarked (among them the President, in one of his Messages), these disputes and lawsuits cannot be imputed to the Government nor to the prefectorial authorities. They arise from the fact that the mining law is extremely liberal both to foreigners and natives, and in practice the former, by negligence or in order to economize, do not rigorously observe the prescriptions of the law.

Both Bolivians and foreigners can apply for mining claims without any expense other than the cost of the necessary stamped paper. They obtain their concessions, and many go no farther. Others do

proceed farther ; they obtain possession, but they furnish erroneous measurements, made by incompetent persons, and do not delimit their property by visible and durable boundaries. It happens that subsequent prospectors make similar applications, and very often, in localizing their claims, superimpose them partly or wholly on claims already conceded. When one of these parties finally prepares to work the concession his neighbours appear and provoke disputes and litigation, relying on the confusion they themselves are responsible for. It is not uncommon for an interested person who wishes to escape the payment of his patent fees to provoke a plea of caducity, in the hope that the concession will be adjudged to the interpellant, so that he may evade the payments due.

In order to shield himself from possible disputes and lawsuits the foreign investor who wishes to exploit mines in Bolivia should, before the conclusion of any contract whatever, require the measurement and survey of his claims or the approbation and verification of the steps already taken, and have the property inscribed with these details in the *Registro de derechos reales* (Register of royalties). Thanks to this formality, which it is now easy to observe, with the assistance of the Governmental engineers, he may be certain of avoiding litigation and of enjoying his acquired rights in security.

XII. To avoid litigation and guarantee property the Bolivian Government towards the end of the year 1910 constituted, in the provinces of Pacajes (La Paz) and Bustillo (Potosi) a Technical Commission of engineers (Comision Tecnica), instructed to draw the plans of mines, delimit concessions, and reconcile interested parties in respect of those points of law which the courts only are competent to decide. By the reports of this commission it is easy to estimate the imperfections, errors, and arbitrary

nature of many old surveys. In certain cases we find there has been actual duplication or superposition ; in others the orientation is different from that indicated in the application, and few concessions are properly fenced off ; in many other cases it is impossible to find a base or point of departure from which to re-survey and determine the exact situation of the property. There are cases in which vacant State lands have been worked without title, or upon mere application only.

Despite the increasing number of applications for claims, due to the increasing price of tin, the number of lawsuits has sensibly diminished, thanks to the Technical Commission, which has re-measured and determined the situation of numerous claims, and has fixed their limits by visible boundaries. On the other hand, the prefects are more careful in demanding precise statements of situation and delimitation.

In view of the results obtained from these commissions the Bolivian Government has requested Congress to create further technical services in the chief mining districts, such as those of the departments of La Paz, Oruro, and Potosi : commissions which would be entrusted with the delimitation of concessions, and which would file plans and pronounce the caducity of abandoned mines. The project is at present somewhat primitive in form, but it is destined to develop in the future, and to be completed by the foundation of a Technical Bureau of Geology, Mineralogical Research, and Survey.

XIII. Finally, it may be useful to give a few details as to the capital required to work, on a modest scale, a tin mine, since tin is the metal that yields the best results. These details have been furnished by professional miners.

In the first place, are there still deposits so abundant that the capitalist interested in such matters

may visit Bolivia without fear of finding everything snapped up, and his comparatively long and expensive journey made in vain? The reply is to be found in the very summary description given in the preceding chapters ; but we may without hesitation reply once for all : he may.

Without reckoning a large number of deposits already known, fresh deposits are being discovered and applied for every moment. During our stay in the mining districts, in the oldest as in the newest, not a day went by but some miner or prospector came to offer some mining proposition to the traveller, for in Bolivia every traveller is a possible capitalist and purchaser.

The situation of such persons may be of two categories. Either they have applied for claims and assumed possession and find that their resources are coming to an end, exhausted by the small expenses involved by these operations, so that they are forced to seek a partner or a purchaser, or they have not even the £80 or £160 necessary to proceed thus far, but, knowing of a lode, they offer to sell the secret of its position, or hope to find a partner who will provide the cost of application and possession. In either case they are looking for a capitalist ; so that it is as a rule very easy to acquire at a bargain a tin mine which it would be profitable to exploit.

The general defect of these mines from the point of view of the European capitalist is the fact that it is difficult to say how deep the tin continues ; as a rule the richness of the ore diminishes with the depth of the workings, but as no mine has been really examined they are all worked on the surface ; their actual value cannot even be estimated. This inconvenience is mitigated by the absurdly low price for which these lodes can be acquired.

It is best for the capitalist who desires to buy

a mine to put up with the delay of opposition, and when the position of all concerned is clear and the litigation concluded, he can buy the rights of all the pretenders. This is the system that gives the best results.

As for the cost of acquiring a new concession, they may be estimated as follows :

| | |
|---|-------|
| Form of application, legal publication, and lawyer's costs | £ 24 |
| Expenses of taking possession | 160 |
| Costs of injunction to nullify possible opposition ... | 16 |
| | <hr/> |
| | £200 |

The mine once acquired, it remains to work it. There are two systems to choose from. The first consists in the installation from the outset of a complete washing plant, of which the cost may be comparatively heavy, but which will deal with at least 15 to 20 tons of ore a day. This system has one defect for the miner whose capital is limited : the loss of the capital sunk in machinery should the mine become rapidly exhausted as the workings go deeper. (It must be remembered that the lode will be of unknown depth.)

The other system consists in the installation of a small and inexpensive washer which will enable the operator to realize a certain profit from the first, while in the meantime he can undertake the necessary examination, sink borings, and so forth : work whose cost will be to a great extent covered by the profits of the provisional workings.

If the mine is found to be rich in its deeper levels, it is always possible to install a large washing plant ; but if on the contrary the tin disappears, the surface ore can be exploited by means of the small provisional installation.

XIV. Here are the prices of some of the pieces

of machinery which would be required for such a small installation :

| | | | |
|--|--------|-------|-------------|
| Trapiche with 3 metal wheels | ... | £ 200 | in La Paz |
| Trapiche with 1 wheel of granite or quartzite... | | 24 | on the spot |
| Fall-buddles of 9 feet diameter, each | | 4 | |

The following prices are those of the machinery required for a final and complete installation ; first the factory price is given, then the price at La Paz, and finally the price assembled and in place at the mine, by which time it will be quadrupled :

| | At the Factory. | At La Paz. | At the Mine. |
|---|-----------------|------------|--------------|
| | £ | £ | £ |
| Crusher | 160 | 480 | 640 |
| Cylinders, 24 by 14 | 200 | 600 | 800 |
| Set of 3 trammels | 40 | 120 | 160 |
| Jiggers, 3 compartments, Harz | | | |
| Mountain type | 60 | 180 | 240 |
| Willey table | 90 | 270 | 360 |
| Frue-vanner | 68 | 204 | 272 |
| Round table | 20 | 60 | 80 |
| Huntington mill | 160 | 480 | 640 |
| Gruson-Werk mill, No. 4, 15 to 20 tons per diem : sold at | | | |
| La Paz | — | — | 440 |
| Pelton turbine | 60 | 180 | 240 |

In either case there will be the cost of implements—picks, chisels, crowbars, drills, hammers, etc.—for twenty men, say, £400 ; an office or manager's house, £80 ; twenty huts for workers, costing £4 each, £80.

These expenses are generously calculated. For the period of preparatory work the capital may be divided thus : purchase, £200 ; installation, machinery, at most £240 ; houses and tools, £560 ; or in all £1,000. Keeping £600 as reserve capital, which is sufficient, we have a total of £1,600.

In Bolivia it is considered that £800 is sufficient

to open a mine, but such a sum only permits of a petty exploitation, which would be dependent upon the caprice of the merchants who buy barilla. It must be understood that the prices just given are not fixed prices, but are given as an indication, and will serve to base an estimate.

Some miners have obtained capital from some foreign merchant with which to exploit their concessions. Others work their mines according to the bad old method of the country : they exhaust all the rich ore in sight. Others, more intelligent, examine the mine thoroughly while partially exploiting it, with the object of selling it at its real value to some European company which would exploit it on a large scale. Among the latter many are very ready to treat with European capitalists, and the latter might do worse than give their serious attention to the exploitation of Bolivian tin.

The profits of exploitation would be greater if the company working the mine were to export the barilla itself, but to do so would require a larger capital than that indicated.

The existence in the same district of a number of small mines belonging to men without capital suggests the possibility of establishing in such a centre a metallurgical works which would purchase the crude ore from the miners, and, after concentrating and smelting it, export it as ingot tin. In this manner a large saving in freight would be effected. At Quime, the centre of the mining district of Quimza Cruz, a watercourse with a rapid fall and an abundant flow would yield all the motive force necessary, and all around are extensive forests of quenua wood, which furnishes a superior quality of charcoal.

It would be worth while to examine the situation attentively, and above all to estimate the cost of a complete metallurgical installation, furnished with the

latest improvements, especially in all that concerns smelting.

Besides tin, the regions we have indicated also contain blende.

After tin and zinc, copper, gold, and silver are found in considerable quantities ; and in the case of these metals, as in the case of tin, not a day passes but some new mine is recorded. One wonders what it will be when the country is easy of access in all its parts and has been seriously prospected. Here is work for very many years, if not for centuries.

We must now speak of the conditions to be observed by foreign limited companies in order that they may obtain a civil personality. Among the various laws which regulate this matter, which contain many duplications, the most complete is that of 1887, which states :

" Article 5. Any company operating in the territory of the Republic, whether its administration (directorate) be established in Bolivia or abroad, will solicit its legal constitution from the Ministry of Industry, and will to that end submit the following documents :

" A certified copy of its charter of foundation ; a copy of its statutes ; a certified copy of the minutes of the inaugural meeting ; this will contain the names of the members of the administrative board, etc., and the certificate of the amount of capital paid up. If the company is a foreign company these documents will be presented duly legalized by the diplomatic or consular agents of the Republic, or in default of these by those of a friendly State."

Article 2 of the same law enacts that any foreign limited company must, in order to commence operations in the Republic, appoint a legal representative in Bolivia, either an administrative board or an agent furnished with all necessary powers to act in its name.

We think we have now said enough to convince the capitalist that it would truly be to his interest to occupy himself in the exploitation of the mines of this new country, particularly the tin mines. But, and we cannot repeat this too often, success depends firstly on a serious preliminary investigation undertaken on the spot, and then on the competence of the manager and the engineers who will be entrusted with the exploitation if the latter is to be on a large scale. We must not forget that in addition to his qualities as a technical engineer who has gained experience in other mines, the manager must also possess those of an administrator. It is to the neglect of these elementary precepts that certain enterprises have owed their difficulties and the loss of their capital.

CHAPTER XXI

INDUSTRY. AGRICULTURE. STOCK-RAISING

I. Embryonic industries.—II. Native cloths.—III. Vicuna rugs ; chinchilla skins ; varieties of chinchilla ; how hunted.—IV. Various industries ; brewing.—V. The internal trade of Bolivia.—VI. Agriculture. Insignificance of the area cultivated.—VII. Products of cultivation in the temperate and tropical belts ; coffee and cocoa.—VIII. Tobacco ; the vine.—IX. Stock-raising in Bolivia ; ruminants of the high table-land ; the llama.—X. The alpaca. Advantages of rational and careful breeding.—XI. Asses ; sheep ; goats.—XII. Horned cattle ; regions favourable to them.—XIII. Cattle in El Beni and the Chaco. Methods of breeders.

I. THE mining industry has absorbed the activities of the Bolivians in a manner almost exclusive. It is in the full tide of revival ; it is rapidly progressing ; but the same cannot be said of the manufacturing industry, whose development is insignificant.

In general, only those industries which employ the raw materials of the country are in a flourishing condition. Their importance, however, is relative ; for excepting the great mining enterprises, the railways, the electric supply works, etc., which have been established by foreigners, the industrial concerns of Bolivia are for the most part of very modest dimensions.

Until lately the relations of La Paz with the outer world were easier than those of the different centres of population among themselves. For this reason the industries could not develop ; they necessarily

remained local or provincial ; for, owing to the cost of transport by pack-mule, their products could not be sold beyond a certain radius. Although this situation is largely modified in the case of the principal cities of the plateau, it is unchanged where the other regions are concerned, whose isolation retards the industrial development of the whole country.

We must add that hitherto the Bolivians have not shown themselves enterprising, doubtless through lack of boldness and initiative, and perhaps a lack of confidence in themselves. Time and emulation will probably remove this reserve and timidity.

By reason of the progress observable in the regions which have been made more accessible, Bolivia to-day offers conditions favourable to the introduction of all kinds of industries, for although the population does not as a whole possess a great power of absorption, it is none the less obliged to obtain from without, and at very high prices, all that is necessary to a people whose culture and whose needs are increasing daily.

II. The weaving industry, for example, is still in an embryonic condition. There is not one establishment possessing a perfected machinery and of a stable character. The only concern of the kind is a small factory of woollen fabrics in La Paz. Yet weaving is the industry of a certain number of half-breeds and natives of the Quechua and Aymara races ; they make fabrics of various colours which, if they are not of fine quality, are at least solid. These natives perform all kinds of weaving, from heavy stuffs of llama's wool, which are manufactured according to the ancient methods peculiar to primitive races, to comparatively fine tissues of vicuna or alpaca mixed with silk ; but they possess no other equipment than four stakes driven into the floor, or in some cases the archaic treadle-loom introduced by the conquerors of Peru.

In the provinces of Mojos and Chiquitos in the north the cotton cloth known as *makanas* is woven ; it is very fine and very strong. It is employed for clothing, sheets, hammocks, napkins, and ponchos ; it lasts indefinitely. At Oruro *bayeton* or *molleton* of pure wool is made in various colours. In the provinces of Chichas and Cinti sheetings of good quality are woven ; the inhabitants of these provinces, where the use of these stuffs is general, go so far as to assert that they are superior to English sheetings in strength, while possessing the same appearance and colour. This is an exaggeration ; but the strength is incontestable. The stuff known as *burra-can*, a coarse cloth, comes from certain villages in the provinces of the departments of Cochabamba and Santa Cruz. The material of these stuffs is sheep's wool and llama's wool mixed. The finer wools of the vicuna and the alpaca enter into the manufacture of a number of stuffs which are naturally more valued.

All these stuffs, made by a limited number of natives, are mentioned merely as a matter of curiosity, for they do not suffice even for the native population properly so-called, for whose use large quantities are imported of a kind of coarse unbleached calico made in Peru ; in Lima there are a dozen factories weaving this fabric. At Oruro a French Basque, Elisetche, has established a large boot and shoe factory, with a branch at La Paz. This factory is prospering rapidly.

III. Rugs of vicuna skin and alpaca skin, of which nearly 90 tons have been exported during the last few years, are becoming rarer, as hunting these animals has been practically forbidden. These rugs, which were formerly worth about £2, to-day fetch £4 and £5 apiece. It is the same with chinchilla skins ; this precious rodent with the silky fur was fairly common in the departments of La Paz, Oruro, and Potosi, but to-day its numbers have sensibly decreased.

There are two varieties of chinchilla, known as the white and the blue. The blue is found from Lake Coipasa northwards, and the white from the same point southward to Puna de Atacama. The chinchillas inhabit the Cordillera, but do not frequent the higher altitudes ; they live in burrows like those of rabbits, or in crevices of the rocks, and are about the size of rabbits. They are hunted by the natives, who, endowed with the patience and tenacity peculiar to the Indian, will spend days on end in searching for their holes. Having found a burrow they drop a ferret in the early hours of the day, the animal being specially trained and secured by a long cord or chain ; they then stop the entrance of the burrow with a bag. Some of these ferrets cost as much as £8. This method, like several others which are more barbarous, results in the destruction of the young, and will soon cause the disappearance of this valuable animal, whose skins sell in the Tacna market at £24 the dozen in the case of the blue variety, while white skins fetch £9 12s. to £12 the dozen.

This industry, practised exclusively by a few natives of Huachacalla, Sabaya, and Caranga, has enabled some of them to make fortunes of as much as £8,000 ; but the extinction of the species will only be a matter of time if measures are not taken to preserve it. However, numerous families of chinchillas have escaped their persecutors in certain portions of the Sabaya and Caranga ranges, where there are deep rifts in the rock, in which the ferrets are often lost ; here they exist in spite of ferrets and hunters, and, indeed, are little hunted in such localities.

To satisfy the increasing demand for chinchilla skins the chinchilla has been crossed with the vizcacha, a rodent of about the size of a hare, but with a larger head, and amenable to domestication. The fur obtained is naturally inferior, but even a few years

ago the skins were selling for £2 the dozen ; now they fetch £3 4s. to £4. Not many Indians are as yet engaged in breeding these animals.

IV. Sculpture, engraving, jewellery, and other artistic and decorative industries are as yet in their infancy in Bolivia. Most goldsmith's shops are merely a department of the watchmaker's ; nothing but repairs is undertaken. There are a few establishments where medals are struck ; of these the best is the mint at Potosi ; it is well equipped and produces good work. At Aroma, the capital of the province of Sicasica in the department of La Paz, there are very able *plateros* (silversmiths), some of whom are distinguished by filigree work which possesses a certain amount of artistic merit. The women of Aroma make bonnets, gloves, and other articles of silk or vicuna wool or sheep's wool.

In all the torrid valleys of La Paz, Cochabamba, Chuquisaca, and Santa Cruz large quantities of cane-brandy or rum are produced, as well as fermented liquors, which are made by the Indians and extensively drunk. The output is not much under 645,000 gallons ; none the less Bolivia imports 883,750 gallons of foreign alcohol—European liqueurs, Chilian spirit, German and Italian spirits and wines and beers. Passable wines are made, more particularly in the province of Cinti.

In the department of Santa Cruz a certain amount of cotton cloth and silk embroidery is made ; and in El Beni hammocks are manufactured of a fabric which is unrivalled for wear.

The Indians also make a great proportion of all their necessities.

These, apart from a few small ordinary trades, are the industries practised in Bolivia. It will be seen that there is plenty of room for innovation and improvement.

V. According to the statistics available it is almost

impossible to estimate the internal trade of Bolivia exactly ; but our own observations permit us to suppose that it is progressively increasing in all the regions influenced by the new means of transport, and that elsewhere it remains stationary.

When there was no railway from the coast to the interior, and all transport was effected by pack-animals, the products of the interior were able, on the central plateau, to hold their own with imported articles of food, as both were about equally burdened by the cost of freight. But after the construction of the railways from Antofagasta and Mollendo, the flours of Cochabamba and the sugar and rice of Santa Cruz found themselves competing on the markets with the products of Chile and California. The quintal of Santa Cruz sugar sold for not less than 24s. at La Paz, so that it could hardly compete against foreign sugars. Rice is to-day brought from India and Peru more easily and at less cost for freight than from the eastern provinces of Bolivia.

This situation will presently be improved by the lines recently built or under construction. At present the cattle which are so numerous in the vast regions of El Beni and Santa Cruz cannot profitably be sent to La Paz. Yet with proper means of communication a large number of products which are produced abundantly and cheaply in other portions of Bolivia might largely nourish the central table-land and compete with foreign imports. For instance, in Santa Cruz rice sells for 6s. 5d. to 8s. per quintal of 101 lb., while in La Paz it costs no less than 28s. to 32s. But actually the cost of transport exceeds this difference. The cost of transport on mule-back from one province of Bolivia to another is very high ; heavy loads cannot be carried, and the loss of time is always great.

Despite these adverse conditions many trading houses are establishing themselves not only in the cities, but also in quite secondary centres of popula-

tion. Several German firms have installed themselves at different points of the road leading from Santa Cruz to Puerto Suarez, and from Santa Cruz to Yacuiba, very sensibly counting on the importance which these regions will presently acquire. We have already remarked that in Bolivia the majority of the export and import houses are foreign, and principally German.

VI. Owing to the same cause—difficulty of communications—agriculture, despite the fertility of the soil (except on the *altopiano*, properly so called) has remained in a purely embryonic stage ; it has only in a few regions slightly progressed, notably in Cochabamba.

The Indians, although greatly given to routine, are sufficiently skilful agriculturalists, utilizing the hills for their crops, building steps or terraces with fragments of rock. These terraces, known as *pircas*, are arranged like the steps of a staircase, and by their means extremely steep slopes can be cultivated. The Indians use the antique plough or *arma*, and have the habit of enclosing their little fields with walls of stone or unburned brick. The Bolivian Indian would probably become a model agriculturalist if he were to cultivate his own land, owing to his love of the soil ; unfortunately he possesses none.

In the departments of Chuquisaca and Potosi the Indians who live on the haciendas or great rural properties work gratis two days in the week. In the departments of La Paz and Oruro this servitude is more onerous, for they must build their houses, plough, sow, reap the grain and carry it to market, to say nothing of the compulsory duty or *corvée* known as *pongueaje*, of which we have already spoken in Chapter X. Elsewhere Indian peons are paid 40 to 50 centavos a day.

Of a superficial area of about 386 million acres, of which perhaps 30 per cent. may be deducted as

occupied by forests, mountains, rivers, lakes, cities and industrial centres, etc., there are 223 million acres available for agriculture and stock-raising. The country could therefore give occupation to a population fifteen to twenty times as large as it is at present. Of this area an infinitesimal portion is at present devoted to cultivation ; it may be generously estimated at 12 million acres, of which hardly the half is really cultivated, as on all agricultural estates, vast latifundios in great part uncultivated, considerable portions are destined for pasture and the rest for future cultivation. Enormous tracts of land are still awaiting the plough.

VII. Thanks to the variety of climates and altitudes found in Bolivia, the productions of the vegetable kingdom are extremely numerous. They may be divided into two categories : spontaneous and cultivated products. These latter are the object of internal trade, and among them figure : potatoes (with numerous varieties, for Bolivia is the land par excellence of the potato, which in the form of *chuno* is the basis of the native's diet), barley, and quinoa¹ (these are almost the sole crops grown on the table-land) ; maize, which grows in the more temperate valleys, and serves the Indians as the basis of *chicha*, their favourite drink ; wheat, rice (in Cochabamba and the east) ; tobacco in El Beni ; sugar-cane in Santa Cruz ; coffee in the Yungas of Yuracares, and admirable coffee it is ; cocoa, and coca, the plant sacred to the Indians, etc.

The departments of the centre, north, and east could

¹ Not to be confounded with quenua, a woody shrub. Quinoa is a sort of millet, highly nutritious, which on the high plateau takes the place of wheat and maize ; it grows in the coldest regions. Its yield is very considerable (2,000 to 1) ; it is easy to cultivate, exempt from disease and pests, hardy, and requires no care. This interesting and valuable crop is sown in October or December, and usually harvested in May.

supply the central plateau with wheat and tropical products in abundance ; however, the sole agricultural products of the interior which reach La Paz are coca, coffee, cocoa, and the fruits of the Yungas of La Paz and Yuracares ; but all, except coca, in quite insignificant quantities.

Coffee is cultivated in different parts of Bolivia, but chiefly in the Yungas, where the quality is exceptional, in the province of Apolobamba (La Paz), and the provinces of Sara, Velasco, Chiquitos, and Cordillera in the department of Santa Cruz. It is also grown in some parts of the department of Chuquisaca. In the Yungas of La Paz, where the output might be considerable, it is actually insufficient, as the preference is given to coca. Cocoa is, if possible, even less cultivated than coffee. It comes principally from the department of Santa Cruz, although it is not even there exploited as actively as it should be ; the best quality is furnished by the province of Apolobamba, in the department of La Paz. This cocoa is well known and much appreciated by the name of Pepita de Misiones or Cavinass cocoa ; there was once at Cavinass a Franciscan mission, now destroyed. The whole country round Cavinass, which lies on the left bank of the Rio Madidi, abounds in cocoa-palms ; some scattered, others in large groups. These groups are thickest and most numerous on the two banks of the Rio Madre de Dios, where there are spots containing more than a thousand palms. In these vast regions, now deserted, cocoa will one day become one of the great crops of Bolivia.

The culture of sugar-cane for the sugar industry is general in the department of Santa Cruz, where the yield is considerable, especially in the provinces of Velasco, Chiquitos, Cordillera, and Valle Grande. However, only a portion of the yield is destined to become sugar, as this, despite its good quality, meets

with the competition of imported sugars throughout the rest of Bolivia on account of the excessive cost of transport in the interior of Bolivia. Sugar-cane is also grown in the province of Azero, Chuquisaca ; the Yungas of La Paz ; and the provinces of Mizque, Totorá, and Chaparé in the department of Cochabamba. Nearly all the sugar-cane grown in Bolivia is employed in the manufacture of aguardiente and syrup or molasses. Santa Cruz alone is responsible for a yearly production of certainly more than 210,000 gallons of alcohol.

Rice, with the development of communications, might become a very important crop in Bolivia. It is now grown in Santa Cruz, the department producing just enough for its own consumption. It might equally well be cultivated in El Beni and the north. Two species are grown, the white and the red, which give a yield of about 40 to 1, and ripen at the end of five months, which represents at least two harvests a year. In the province of Chiquitos rice exists in the wild state.

VIII. Tobacco is grown in the hotter regions of the department of La Paz, and in the departments of Cochabamba, Santa Cruz, El Beni, and Tarija, where all the known varieties are cultivated, especially those known as *criollo*, *lengua de buey*, *lechuguilla*, *negro habana*, and *habana*, whose quality is excellent ; but here again we are speaking of an extremely limited production, for Bolivia produces barely 3,500,000 lb. of tobacco annually, which does not even suffice for the consumption of the country.

Viticulture certainly has a great future before it. Already it is in a flourishing condition in the provinces of Loaiza and Murillo in the department of La Paz, in the province of Mizque in Cochabamba, and above all in the province of Cinti in Chuquisaca, whose wines have already acquired a good reputation

in Bolivia. The vines most generally grown are the *criolla* or Bolivian vines, originating from the ancient plantations made by the Spaniards, and the French or Bordeaux vine (*bordelesa*) imported from the Argentine. Cinti and Mizque produce the most, but only at Cinti have the vine-growers begun to introduce modern methods of procedure ; everywhere else the methods in use are absolutely primitive. In the provinces cited there are immense tracts of land suited to the vine, but for lack of labour they must perforce lie fallow.

To sum up : each of the crops we have named occupies a comparatively small area. The production of coffee, cocoa, sugar-cane, rice, etc., is intended merely for internal consumption. Of all these products coca alone is exported to Chile and the Argentine, but the quantity exported might well be exceeded. In the Argentine the provinces of Salta, Jujuy, Catamarca, and Tucuman consume coca to the estimated value of £48,000.

In order to encourage agriculture the Government is founding a College of Agriculture at Cochabamba ; as this is not the first experiment of the kind we may hope it will be animated by a practical and tenacious spirit. The Normal Agricultural and Industrial College is to be founded in the neighbourhood of Sopocachi. It will give its graduates the title of perambulant agricultural instructors ; they will serve the Government, which will send them about the table-lands and into the interior.

IX. Although Bolivia possesses vast tracts of natural meadow or prairie, fitting pasture for all manner of cattle, we cannot say that stock-raising, in the true sense of the word, has yet come into being ; such as it is it has remained absolutely primitive. With the exception of the llamas and alpacas, the cattle of Bolivia have been allowed to degenerate and present a sickly appearance compared with the

cattle of neighbouring States. The horse, although all horses of South America have one common origin, has degenerated on the high table-land into a beast without stamina and of indifferent size ; there are hardly 100,000 in all the country ; as for cattle, they are only found in the neighbourhood of towns, and then only in scanty numbers, so that butcher's meat is comparatively dear.

For transport the native employs the ass and the llama. The latter is to the Indian what the reindeer is to the Lapp ; he utilizes its wool, its flesh, its bones, even its excrement as fuel. The salted flesh of the llama, cooked with various species of potato, maize, beans, etc., is the Indian's favourite dish ; of the wool, spun and woven and dyed by the women, he makes his clothes, and also cordage ; the skin serves for the manufacture of bags and sandals, and the bones enter into the construction of musical instruments and various primitive implements used in weaving. The Indians profess a kind of veneration for the llama.

This animal, which is valued at 12s. to 16s. a head, is used principally as a beast of burden on the high plateau, and has so been employed from time immemorial. One sees troops of llamas, *piaras*, of twenty-five to thirty strong, slowly proceeding along the most difficult paths bearing ores, salt, grain, etc., in loads packed on either side of the spine, and not exceeding 100 to 120 lb. The llama rarely makes more than twelve or fourteen miles a day, but its upkeep is not expensive ; it contents itself with browsing as it goes on the coarse grasses which grow in the high mountain regions, and which another animal would scorn.

The total number of llamas in the Republic must be about 400,000. There is hardly a native family which does not possess four or five, and herds do exist of more than a thousand head.

The llama (*Camelus lama*), alpaca (*Auchenia alpaca*), vicuna (*Camelus vigogna*), and the guanaco (*Auchenia guanaco*), belong to the order of ruminants.¹ The vicuna and alpaca are animals peculiar to the high table-lands of Peru and Bolivia, while the other two species are encountered in all the higher regions of the Andes from Ecuador to the Argentine pampas. Their food is usually the coarse pasture known as *ichù*, which is found in the higher regions of the Cordillera. Llamas and alpacas, unlike vicunas and guanacos, live in large and thoroughly domesticated herds; the others wander wild in little groups over the range of the Andes. The wool of the vicuna and the alpaca is superior to that of the other two creatures; it is greatly valued, and if the creatures were bred rationally and on a large scale would form a considerable source of revenue.

X. The alpaca, which, despite many efforts, has never been acclimatized away from the high table-lands, has the appearance of a short-legged llama; it is most abundant in the provinces of the Titicaca plateau—Lipez, Chichas, Porco, Carangas, Sicasica, Pacajes. The regions in which it prospers are the coldest, the most solitary; those in which snow falls instead of rain; on the flanks and in the gorges of the high Cordillera, where the springs and torrents are continually fed by the melting snow, and where meadows of stunted seed-bearing grasses are found. A cold and slightly humid air, and water that is absolutely pure, are indispensable to the perfect health of the delicate organism of the alpaca. The breeding of alpacas has not yet been undertaken by any but the

¹ The vicuna and, more especially, the guanaco are taller and slenderer than the llama and alpaca; the vicuna, which is diminishing in numbers, lives only in the wild state, as does the guanaco; it yields a fine silky wool which is greatly valued, and is employed in the manufacture of mantles and rugs, etc.



ALPACAS IN THE HUAYNA-POTOSI RANGE.

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natives, whose patience and endurance best fit them for the care of such creatures. These herdsmen, ignorant of rational methods of breeding, confine themselves to grāzing their flocks, counting them so that none shall stray, and keeping the sexes apart. Llamas and alpacas breed together promiscuously, but it is best to breed only beasts of the same species. The period of gestation is eight months, and in general the female bears only a single offspring. Alpacas vary greatly in the colour of their wool ; some are yellow, some coffee-coloured, some white, some black. The long silky wool is in great demand ; shearing takes place once every two years, and the fleece weighs from 11 to 15 lb.

There are about 180,000 alpacas on the high Bolivian plateau. The region in which this animal thrives best is the province of Carangas in the department of Oruro ; it offers abundance of clear streams and pastures and prairies of dwarf seed-bearing grasses. There are in this province nearly 100,000 acres of land which might well be devoted not only to raising alpacas, but horned cattle and sheep. It would be easy to utilize the vast plains in the centre and the south, employing the waters of the two small rivers, the Lauca and the Barras, which run right across them. On higher ground there are sheets of water, which extend throughout the subsoil of all this region at a depth of not exceeding 40 feet.

The Bolivian Government is anxious to stimulate the alpaca industry, as in view of the high price of the wool it should obviously be remunerative. To that end it has established in the province of Carangas a model farm in the care of a veterinary expert, where the best means of preserving and improving the species will be practically studied. As the female alpaca costs only 16s. per head and the male even less, the exploitation of this animal should be neither difficult nor costly.

The Government is also considering the question of alpaca-breeding in the province of Muñecas (La Paz), where there are many cattle. The preliminary reports have been so favourable that an industrial company has been promoted, which is establishing itself at Ulla-Ulla, with the object of buying all the wool produced in the provinces of Camacho, Muñecas, and Caupolicán. In addition to reaping the advantages of rational breeding, the company hopes thus to prevent the illicit exportation of alpaca wools across the Peruvian frontier at Cojata ; and the Indian will possibly be a gainer also in that he will be less remorselessly exploited.

XI. The central plains of Turco, Huachacalla and Corque, and the ranges of Sacasaya, Titiri, and Oyarani already support more than 20,000 asses. This number might easily be trebled and the breeding of asses constitute a genuine industry ; at present these animals, so useful to the country, are abandoned and uncared for. At the fair of Huari numerous troops of asses are sold for use in the provinces of Pacajes and Sicasica. The price of a donkey fresh from the prairie is from 19s. to 24s., according to age. The total number of asses in Bolivia must be about 170,000. Different regions of the high table-land and neighbouring regions support a total of some 1,500,000 sheep. The departments in which these animals are most numerous are Potosí, Oruro, Cochabamba, Chuquisaca, and Tarija ; the mountainous, then the cold, and then the temperate regions. The vast plains of the east account for very few. The raising of sheep is no more seriously practised than that of asses ; even on the great rural estates there are no large flocks ; each native owns a few sheep which he grazes but otherwise does not tend. With the milk of the ewes the natives, particularly those of Paria, make a favourite cheese. Mutton, dried and salted in large joints, a preparation known

as *chalona*, is the object of a large trade and yields handsome profits.

Goats might also be bred with much profit to the breeder, for the skin finds a ready market everywhere. But no one seriously exploits this animal ; it is only seen in small herds, and there are less than 50,000 goats in the whole country.

XII. The owners of the great haciendas confine themselves to raising a few cattle ; they supply local needs or are consumed in the manufacture of *charque* or dried beef. They do not concern themselves with the improvement of races nor do they study the causes of the maladies that decimate their herds.

All the departments of the Republic in general possess special regions in which stock-raising would be easily developed, particularly those of Chuquisaca, Santa Cruz and Tarija. Already a certain number of head of cattle are exported into the frontier provinces of the Argentine from cattle-breeding centres in these regions. Arcopongo, in the province of Inquisivi, La Paz, contains large tracts of good pasture which might graze many head of cattle. The same is true of the province of Caranga, Oruro, but there the natives have specialized in the breeding of alpacas and llamas.

The ideal regions for raising horned cattle are to be found in the eastern portion of the country, in the immense plains or *llanos* of the Chaco, Santa Cruz, Chiquitos and Caupolicán, which are covered with alternations of vast natural prairies and widespread forests. In the Chaco and the *llanos* of Mojos there are large herds of cattle living in an absolutely wild condition. These animals, whose numbers are diminishing as civilization advances, still form a total of 1,500,000 head. At the time of our visit certain Argentine capitalists were endeavouring to obtain vast concessions in the Bolivian Chaco, near the frontier,

with a view to future speculation and the establishment of ranches.

It is difficult, if not impossible, to establish exact statistics concerning the number of horned cattle existing in Bolivia, for the owners, large and small, seeing in requests for statistical facts only a means of burdening them with fresh taxes, either evade the questions put to them or give incorrect replies. According to a census so obtained we find that there are 750,000 head of cattle in all Bolivia, without counting the wild cattle called *ganado cerril* or *montarace*, or the cattle of the Chaco. The departments richest in cattle prove to be El Beni, Santa Cruz, and Chuquisaca.

XIII. From the region lying between Santa Ana and Reyes in the department of El Beni come all the cattle which supply the rubber exploitations of the northern Beni and the Territory of Colonias, in the form either of "beef on the hoof" or *charque*, sundried salted meat, like the *biltong* of Africa. In the first case the sale of the cattle takes place either on the plain or in the corral. The average price on the pastures is 10s. to 13s. the head, but in that case the purchaser must capture the beasts with the lasso or employ a dozen men to round up and cut out the cattle purchased; so that as a rule the buyer prefers to pay 16s. to 22s. the head and buy from the corral. On the high plateau in the neighbourhood of the cities, a fat bullock which would formerly sell for 48s. to 56s. is to-day worth £9 10s. to £11; in the interior a bullock not specially fattened will fetch 32s. to 48s. It must not be forgotten that in the interior of the country cattle soon degenerate, so that a bullock will yield only 300 to 320 lb. of meat.

The importation of pedigree stock for the purpose of improving and crossing strains would be an excellent means of improving the "creole" cattle, which at present breed without selection or care of any kind.



A *PIARA* OF LLAMAS CARRYING ORE.

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In this direction the Government has made some experiments, which as yet have not been very happy. At Calacoto, for instance, it has established a stud centre managed by an Italian veterinary expert, the Director of the Agronomic Institute, and at great expense a few bulls of Dutch strains have been imported. Owing to the routine in which most of the stockowners of the country are steeped, and their ignorance of the advantages of crossing strains, this establishment has been almost useless.

In the regions named, and especially in the south-east, there is a great future for the stock-raiser, but at present the difficulty is to stimulate his zeal. Before long he may see his best pastures invaded by Argentine graziers from across the Pilcomayo, when emulation will doubtless awaken him. On the other hand the development of the internal cattle trade depends upon improved means of transport. At present the cattle of the grazing districts lack outlets by which they can reach the markets.

CHAPTER XXII

IMMIGRATION AND COLONIZATION

I. The problem of immigration in Bolivia. What has been done to solve it.—II. The law of 1907. Regions reserved for colonization.—III. Regulations not applied. The question of remotely situated colonies.—IV. Regions favourable to colonization.—V. The necessity of organization.—VI. Those who should emigrate to Bolivia.—VII. The acquisition of vacant lands. Too liberal distribution of fiscal lands. Total area of land conceded in a few years. Future consequences.

I. APART from those immigrants whose object it is to engage in trade or industry, and who, although few enough as yet, are daily increasing in number, there has never been any real flow of immigration into Bolivia. The problem of colonization, which so profoundly interests the statesmen of the principal South American republics, has not yet been attacked in Bolivia with sufficient decision, having regard to the scanty population and the vast superficies of the Republic.

In Bolivia, however, as in other countries, this problem is a question of opportunity, and depends upon several factors, of which the first is the pecuniary element. The exceptional conditions which the north-west, east, and south-east of Bolivia offer to the agriculturalist and the grazier, constituting a mine of wealth and a powerful stimulant to the current of immigration which will set thither in the future, cannot, unhappily, be utilized for the moment

by reason of the almost insurmountable obstacle which the present state of the roads and means of communication opposes to the exploitation of the most valuable portions of the country.

Again, to attract foreign colonists from Europe and to install them suitably and accord them proper facilities would call for abundant resources. The difficult thing is not to attract immigration, but to maintain it.

From the foundation of the Republic down to the year 1890 the laws relating to immigration were limited to a few somewhat vague decrees. In 1884 the Ministry of Colonization was created. The first result of this institution was the passage through Congress, in the year 1886, of a law determining upon the colonization of the uncultivated lands belonging to the State in the departments of Chuquisaca, Santa Cruz, El Beni, Tarija, La Paz, and Cochabamba. These matters rested until 1890, when President Arce signed a decree conditioning the colonization of these vacant lands conformably with the aforesaid law ; but not until 1907 did the Ministry of Colonization obtain a budgetary appropriation of a certain sum designed to initiate the movement, and issue a decree referring to free immigration, of which we will now consider the principal dispositions :

II. Any foreigner, whether workman, agriculturalist, or artisan who, being less than sixty years of age, desires to settle upon Bolivian territory, shall be considered an immigrant.

He will enjoy the following privileges : transport to his place of destination, over existing railways or diligence lines ; this privilege will be extended to his wife and to children of the masculine sex over eighteen years of age. All his baggage will have the right of free entry—that is, his bedding, cooking utensils, tools, a gun or rifle for hunting

purposes, etc. He will have the right of free choice of a plot of 124 acres of land of a value of 10 centavos per hectare (about 5d. per acre). Sons over fourteen years of age have the right to a plot of 62 acres.

According to the decree of the 25th of April, 1905, the lands here mentioned by distinct regions have been reserved by the Government for colonization.

Region A. Territory of Colonias.—It comprises the south-west of this territory, lying between the Rio Tambopata from its confluence with the San Blas to its confluence with the Madre de Dios; this latter river to its junction with the Rio Heath; the line uniting this point with that of the union of the Rios Chumini and Madidi; and finally the course of this latter as far as the range in which it rises. The superficies of this region is approximately 6,641 square miles.

Region B. This is in the province of Caupolican, department of La Paz. It extends between the Rios Beni, Madidi, and Sayuba, and the chain of mountains which divides the sources of the two last rivers. Approximate area, 5,882 square miles.

Region C. In the department of El Beni, province of Itenez. It comprises the territory lying between the Rios Mamoré and Itenez, the 64th meridian (Greenwich) and the 13th parallel of South latitude. Area, 4,831 square miles.

Region D. In the same department and the same province; comprising the territory lying between the Rios Paragua and Guaporé or Itenez and the frontier of the department of Santa Cruz. Area, 6,545 square miles.

Region E. Embraces the provinces of Chaparé and Ayopaya, in Cochabamba, in the valleys of the Rios Isiboro and Securé, with an area of 7,122 square miles.

Region F. This is the largest ; it comprises the provinces of Velasco, Chiquitos, and Cordillera, in the department of Santa Cruz. The northern portion of this region lies between the Rios Paragua, the boundary of Region C, the Rio Verde, and the frontier of Brazil. The central portion comprises the territory included between the Rios Sapocos, Oriental, San Miguel, and San Luis, and the mountains from which they flow. The south-eastern portion occupies the whole of the valley of the Rio Otuquis, the San Juan and Sunsas mountains, and the sources of the Rios San Fernando, Santa Corazon, and La Calque, which have their source in the latter mountain. The total area of the three portions is 35,728 square miles.

Region G. In the department of Chuquisaca, of which it comprises the eastern portion, and the province of Azero, with an area of 26,083 square miles.

Region H. This represents the territory or province of the Gran Chaco, formerly dependent on the department of Tarija. It occupies the territory extending between the 21st parallel and the Pilcomayo, the 61st meridian, and a line parallel to the course of the Pilcomayo, but 68·8 miles distant from it. Area, 11,646 square miles.

The total area of all these regions, which the Government is reserving for colonization by foreign or Bolivian elements, consists of a total area of 103,928 square miles, the total area of the fiscal lands existing in the various departments being 231,000 square miles.

III. The budgetary resources of Bolivia do not permit of the complete nor even of the partial application of the law of 1907. Very large sums of money would be required to put it in force, and the Government very wisely preferred to wait for better economic conditions and realize a programme of public works, without which immigration and

colonization would be impossible. We shall not here discuss the value of the facilities which this law accords to the immigrant, as it will necessarily be modified and improved in the future.

In respect of the lands reserved for colonization, it seems to us that the Bolivian Government is committing a regrettable error in purposing to install foreign immigrants in regions which are certainly extremely fertile and productive of great natural wealth, but which are extremely remote, and, at present, difficult of access. We have witnessed the commission of the same initial fault in other and neighbouring countries, and notably in Brazil, where the colonies we visited were established far in the interior, in order to *poblar* (populate) the country. None of the colonies so founded was prospering, despite the facilities accorded in the matter of provisions, seeds, agricultural implements, etc. The European immigrant, accustomed to live among his fellows, and already a little homesick when he finds himself newly transplanted in a country whose language and customs are strange to him, is even more so when he finds himself practically isolated in an almost uninhabited region.

Left to himself, without the stimulus of emulation, he becomes discouraged and abandons his holding to return to his own country or to settle in a more accessible region. This is what had happened in the colonies we have mentioned; the holdings were deserted, and those who could not leave them were vegetating wretchedly, like so many natives, requiring nothing of the soil but the bare necessities of life. The example is neither profitable nor encouraging; but the error had been recognized, and at the time of a recent visit to Brazil we saw numerous prosperous colonies in the neighbourhood of cities or near railways or fluvial highways.



THE AUTHOR—ON THE PLATEAU.

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IV. To our thinking, the only method of colonization possible in the Territory of Colonias, and a large portion of El Beni and even of Santa Cruz, with the means of communication what they are, would consist in the concession of fairly generous holdings which should enable the colonist to engage in trade, or the collection of rubber, or the cultivation of sugar-cane, rice, coffee, cocoa, etc. In this portion of Bolivia the protection of the authorities is more often than not illusory, on account of the distances and the difficulties of communication ; as a rule the colonist will do well to rely on himself alone, and perhaps he is none the worse off for that.

In this tropical region of Bolivia European workers should emigrate only to Riberalta and Villa Bella, where a labourer without any special knowledge will readily earn 10s. a day, with lodging and medical care in case of illness. Any craftsman—cabinet-maker, decorator, mechanic, locksmith, carpenter, etc.—is certain of a wage which will in no case be less than £1 to 25s. a day, but living is very dear. Riberalta, although in the tropical zone, enjoys a healthy climate, and the city, being built on a height, is comparatively free from endemic disease. It is expected that the new Madeira-Mamoré railway will bring immigrants hither from Europe and North America. Villa Bella is less healthy.

The organization of an immigration of agricultural labourers is quite a possible thing, and it would prosper. But for a long time yet little can be done, and the field will still be an extensive one if limited to the fertile and temperate regions of the Republic, such as the plains of Cochabamba, Sucre, Tarija, and Santa Cruz (central and southern), and, above all, the region watered by the Upper Paraguay, where it is believed the Bolivian Government intends to create a new department, that of Chiquitos, with Puerto Suarez as capital. Immi-

gration and colonization are scarcely possible on the high table-land ; the severe climate and the quality of the agricultural products would be very unlikely to stimulate the immigrant's ambition ; the agricultural region is extremely limited, and agriculture is left in the hands of Indians who are as ignorant as they were at the time of the Spanish conquest. The Indian knows very few necessities, and no labour can ever replace his in this region.

The region which will attract the largest number of immigrants in the future is that extending along the banks of the Paraguay to the north of the Chaco ; a region served by frequent steamers ; but as part of the littoral of the river is claimed by Paraguay it would be well to settle the dispute once and for all by means of arbitration. There is no doubt that the natural frontiers of Bolivia are the Pilcomayo and the Paraguay.

V. Bolivia cannot as yet expect a spontaneous current of immigration, but that is no reason why she should not practise official colonization, the most effective kind of colonization to begin with, when practically directed, as it is not vitiated by the grasping policy of companies, which speculate not only in the transport of immigrants, but which often, having monopolized vast tracts of territory, resell them to the colonists under onerous conditions. Immigration is only possible if supported by an official organization ; how otherwise could a foreign population be attracted to a country so little known and regarded as so remote ?

In order to colonize, the zone to be exploited must be determined ; it must then be divided into lots to be given gratuitously or leased ; then roads must be opened to let in the articles necessary to the colonists and to let out their crops. On his arrival the immigrant must be met, directed, transported to the chosen allotment, and assisted until his labours

become remunerative. Colonies should be established beside or near the roads, or near cities or masses of population, whose conditions they will improve by diminishing the cost of living. But the soil in such localities is usually in the possession of Bolivians, who, although they make no use of it, will not readily part with it, or will ask exaggerated prices for it. As in the neighbouring States, the Government and the municipalities, before they can establish colonies in these regions, must expropriate or purchase these lands.

At the present time it might be possible to make experiments in agricultural colonization at a few selected points, but only on a small scale. As nothing is as yet ready the only policy is to wait; the regulations are not applied, so that immigration will be possible and will yield appreciable results only when the locomotive has reached the regions already cited as the most favourable for colonization. The Bolivian Government is wise to wait for the completion of the railways now under construction or projected, as once the problem of transport has been solved its efforts may well be durable.

VI. We cannot recommend the emigration to Bolivia of persons who have practised no trade, or of those who exercise a liberal profession; such will find nothing to do in Bolivia. As for most of the trades and crafts carried on in Europe by labourers or artisans, in Bolivia they are practised by the Indians, whose wages hardly ever exceed 1s. 8d. a day.

At the moment there is no room in Bolivia for commercial employees; there are not many situations to be had, they are poorly paid, and it must not be forgotten that living is very expensive. As for artisans and workmen practising special trades, there is a certain need for them which, though small, is daily increasing. At the present time the best

plan for the craftsman to follow is to go out to Bolivia already engaged by some person or company engaged in a genuine undertaking, such, for example, as the opening or working of a mine. Under the same conditions of previous engagement there is also room in Bolivia for engineers, chemists, and teachers familiar with the Spanish language. There is room also for capitalists in search of business ; for manufacturers and traders who think of setting up for themselves in one of the large cities, where they can create a good position. With sufficient capital the purchase of property in certain regions, for example, in the Yungas, or the neighbourhood of Cochabamba, would certainly ensure a handsome profit ; but in such a case the capitalist must either find a manager whom he can absolutely trust or himself learn how to handle the Indians, whose customs and language he must understand.

Finally, nothing must be undertaken at a venture ; conditions must be seriously studied ; action should follow only after ripe reflection. No one will reproach us for these few restrictions, for although the country has need of capital and of workers it has no room for outcasts and failures, who would be a burden and a reproach. Bolivia needs industrious men, active and enterprising workers, who know where they are bound for and what they want, and are not ignorant of the difficulties which may confront them at the outset. It is a mistake to paint all things rose colour or to pretend that first steps are anywhere easy. If in South America it is permissible to hope for great things, it is only at the cost of initiative, labour, and perseverance. Those who fancy that a speedy fortune is to be made merely by crossing the Atlantic are destined to be cruelly disappointed, and are likely to swell the ranks of the discontented, who, once back in their native country (if indeed they manage to return), say the

most ridiculous things about a land they have only glimpsed and of which they know nothing.

VII. Although colonization on a large scale is as yet impossible, it is easy to obtain large concessions of land in Bolivia ; but in general such concessions are in remote regions and at a great distance from the large centres of population. In this respect the Bolivian Government has lately come to realize that it has been imprudently liberal. By the law of the 26th of October, 1905, it was enacted that any Bolivian or foreigner enjoying juridical rights could solicit from the executive, at the price of 10 centavos per hectare, as many as 20,000 hectares (nearly 50,000 acres), on the sole conditions of priority of application or previous occupation. Such a law in respect of vacant lands renders any rational and profitable distribution of the fiscal domain impossible.

The experience of several years has proved to the Government the futility and danger of the system of adjudications authorized by the law of 1905, which, by the great liberality of its provisions, is liable to favour no one but the unscrupulous speculator. Land is applied for by persons who have no special capacities and no capital whatever to undertake its exploitation. It even happens in some cases—some say in most cases—that the applicants do not even know where their concessions are situated. As soon as it is known that vacant lands exist anywhere there is a shower of applications, whose sole object is the acquisition of something that may at some future date be sold at a profit, should any one be so enterprising as to exploit the locality in question. Taking advantage of the obscurity of Article 4 of the law of 1903, speculators have sometimes obtained a number of concessions in different districts.

From the passage of the laws of 1905 and 1912

the total area of the concessions recorded amounted to 9,010,250 acres, of which 4,400,480 were in Santa Cruz and 3,511,888 in the Chaco. These figures do not include lands granted under previous laws or those which are the object of litigation or dispute, for, as in the case of mines, and for the same reasons, it often happens that concessions overlap or have been sold several times over. Neither do these figures take into account the lands sold or conceded to the companies engaged in building railways, as, for instance, to the Bolivian Railway Company or to Mr. James S. Whitten (each of whom has obtained a concession of 1,000 square leagues), while the Madeira-Mamoré Company has obtained 1,500 square leagues and Señor Patino 200 ; all in regions which offer the best conditions for their industrial or agricultural exploitation.

Owing to the lack of qualified surveyors the mensuration of these lands is confided to incompetent persons, to the prejudice of those interested, who find themselves involved in litigation, based on errors of calculation or the omission of legal observances. The Government tries to remedy these abuses by recording the dates of all concessions, in order to make sure that the concessionaires have endeavoured to settle at least one family per thousand hectares during the period of four years which the law allows. It has also suspended the sale of vacant lands in the Gran Chaco and the provinces of Arce and Sulinas, in the department of Tarija, on account of the numerous applications granted and in suspense, and in order to avoid litigation and confusion.

One consequence of concessions granted so liberally and inconsiderately has been the increase of the unproductive latifundios, which were already too numerous, the inconveniences of which we have remarked in our works on the neighbouring States. To mitigate the results of this situation and in order

to resume the lands which would otherwise make their want severely felt in the future, the Government should not hesitate to declare the caducity of those concessions on which no attempt at exploitation has been made within a given time, or, better still, should pass a law charging these unproductive lands with a tax of so much per hectare. In default of the payment of this tax during one year the concession would become inoperative. It is certain that such measures would be productive of the best results.

CHAPTER XXIII

FOREIGN TRADE. CONCLUSION

WE have shown in the course of this book how greatly Bolivia has been favoured by nature. It possesses the greatest variety of mountains, plains, and valleys—all the forms that the soil can assume.¹ Its products, animal, vegetable, and mineral, are both numerous and abundant. Bolivia is like a complete summary of the whole globe.

The Bolivian Government owns great stretches of vacant lands in the tropical and temperate zones, which are suited to the production of a great variety of agricultural and mineral products, and for grazing purposes. The tropical regions lend themselves to the production of rice, coffee, coca, cocoa, cotton, tobacco, sugar, bananas, rubber, timber, etc. In the lofty valleys of the Andes there are regions especially adapted for breeding the llama and alpaca, an industry which might assume large proportions and yield great profits.

In the temperate regions, where the soil is adapted to the production of every kind of crop and fruit, there are vast forests rich in gums and resins, dye-

¹ It is this universality, so to call it, which has been the cause of the widely differing judgments which have been formed by different travellers in Bolivia. Each, according to the region he has visited, has painted Bolivia as a barren desert, or a paradise of verdure; the truth is that it is both.

stuffs and medicines, while the cedar and a thousand other varieties provide timber for constructive purposes. The exploitation of incense and copal in particular would yield handsome profits, for there are vast groves of these precious trees which have not as yet been touched.

The torrid zone is favourable to the growth of tropical fruits and cultures, which would prosper admirably with active labourers and, above all, means of transport. The torrid regions possess a marvellous flora and fauna as well as a great variety of pasturage, which would make them an ideal country for the breeding of all kinds of cattle. Fruits and vegetables also, cultivated according to modern methods, would give excellent results. In the Cordilleras the mines, more especially those producing tin, merit the serious attention of the capitalist.

Until recent years all agreed in giving a pretty poor account of Bolivia, by reason of the wretched means of communication, the primitive civilization of a portion of the population, and the discords of the past. At the present moment Bolivia furnishes the spectacle of a magnificent effort at renovation, which deserves to be followed with attention. It is an essentially new country, which has need of labour and capital to develop its mining industry, which has at last manifestly reawakened, and its agriculture, of which we may say that it is as yet unborn; a country in which of all the questions now before the public the most interesting is the railway problem.

It is emphatically in the interests of every European country to extend its relations with Bolivia. It will have much to gain thereby. It is time to overcome the old prejudices against such Latin-American States as Bolivia, which many have been too ready to confound with countries like Paraguay and Ecuador, countries whose political upheavals

(which are not as a rule very serious) make it difficult to regard them seriously.

Despite its limited population and the small number of its cities, Bolivia offers an outlet to European goods which is by no means to be despised. Above all, we should anticipate and prepare for the future.

As with the rest of South America, the chief articles of import are chemical products, drugs and medicines, spirits and wines and liqueurs, tinned meats, textile fabrics, perfumery, articles of furniture, skins, and hides.

Bolivia also imports a considerable quantity of prepared metals and manufactured metallic articles ; articles of clothing, glasses, bottles, calicoes, etc. Most of the wine drunk in Bolivia comes from Chile, Bolivia producing only a small quantity of indifferent wine, which sells for almost as much as the imported article. Alcohol is imported in a highly concentrated condition in order to evade the cost of transport ; it is broken down for use on arrival. The eastern valleys of Bolivia manufacture a large quantity of cane sugar, but as sugars (or rather the moist varieties) are sold at a very low price in Bolivia, the planters prefer to make rum with their syrup. Even so Bolivia offers an excellent market for the sale of spirits, especially the departments of Cochabamba and El Beni.

Bolivia has practically ceased to import foreign beers, even Chilean beers. La Paz now boasts an excellent brewery, which produces a very fair beer and makes magnificent profits. There is another brewery in Cochabamba, which provides the city and even makes English and German beers.

The duties payable on beers, wines, liqueurs, and other alcoholic drinks are not very heavy. Bolivian beer pays 1 centavo per litre ; foreign beer, 5 centavos. Bolivian wine pays 2 centavos per litre ; foreign wines, 5 centavos. Generous foreign wines

such as Burgundy, Bordeaux, sherry, port, Malaga, Madeira, etc., pay 10 centavos.

Native rum or aguardiente pays 2 centavos per litre. Foreign spirits and liqueurs, such as brandy, whisky, gin, Chartreuse, bitters, aperitifs, and other liqueurs, 20 centavos. Champagne pays 50 centavos (9s. 6d.) per bottle. Foreign liquors coming from countries benefiting by treaties with Bolivia will pay the duties conformably with the stipulations and usages current, so long as these contracts are not modified.

Empty bottles, metallic capsules, and corks are free of duty.

Commercial travellers enjoy free access to Bolivia ; there are no formalities to be fulfilled, but it is always as well to obtain a passport, although it will not be demanded, and especially proofs of identity. A tour through the principal cities of Bolivia is, as we have seen, at present a long and costly affair, on account of the expenses of transport and the delays occasioned by its imperfection. To these expenses we must add the cost of the municipal patents which the commercial traveller must obtain in certain cities. These patents are of the first and second class, which is determined by the importance of the business which may be concluded and of the firms represented. Except in Cochabamba, where the patent is valid only for one visit, each patent is good for a year.

The cost of these patents is as follows : La Paz, £24 first class ; £16 second. Sucre, £24 first class ; £16 second ; £12 third ; £8 fourth. Cochabamba, £16 per visit ; no classes. Oruro, £20 to £4 as the municipality decides. Potosi, £12, £8, and £6 8s. Tarija, £16 and £8. Tupiza and Uyuni, the same. Santa Cruz, £8 and £4.

Commercial usages in Bolivia are those in vogue elsewhere. The usual mode of payment is by acceptance of bills at ninety days, in consideration of docu-

ments enabling the purchaser to obtain delivery. The banks at La Paz will generally undertake to procure acceptance and to receive and transmit the documents, and then to collect for the vendor. The latter, of course, should obtain references concerning the purchaser.

It should be noted that a protested bill may be immediately presented and must be accepted in case of default, while failure to protest may result in long and costly delays. According to the Bolivian code the protest should be made before a notary the day after default before 3 p.m. The cost inclusive will be 8s. to 16s.

It is naturally greatly in the interest of commercial houses in La Paz and elsewhere to receive their goods with as little delay as possible. Delay may mean the loss of a portion of the season ; extra promptness may mean a considerable advantage over competitors. Hitherto the Magellan Straits route has been the most frequented, and the vessels of the Pacific Steam Navigation Company, which are more rapid than those of the Kosmos (German) line. The tariffs of these two companies, and that of the Chilean South American Company, are identical.

Much trade is done and more might be effected by means of postal orders. It cannot be too strongly urged upon the English trader that if he wishes to find customers in South America he must despatch thither catalogues printed in the Spanish language.

Any exporter hoping to do business with Bolivia should take pains to learn the needs of the country, its resources, and the best means of making a market. Let him go out himself if possible, or send a confidential representative ; in other words, let him survey the field, either personally or by proxy.

According to the statistics Belgium, in 1898, occupied thirteenth place in respect of her exports to the republics of the Pacific coast. To-day, thanks to her

perseverance and common sense, she has attained the fifth or sixth place. One explanation of the success of the Belgians is that more than most exporters they have read and digested the consular reports dealing with the country, and have carefully absorbed all the information given by special and more or less official publications.

Our own experience has been hardly won, and we venture to offer a word of advice to the enterprising young man of business. Do not let him think it is the easiest thing in the world to create industrial or commercial enterprises abroad. Previous study is essential if he would not risk his capital or waste his time. The industrial or commercial emigrant or traveller should familiarize himself with those portions of the country in or with which he hopes to do business ; he should study its climate, its population, its conditions ; should learn something of the administrative authorities to which he will be subject, and the political organization of the country ; especially should he study the manners and customs of the country, that he may not infringe them and give offence ; and should seek how best to obtain the goodwill of the people. So, with the aid of those precious instruments of labour, good health, good temper, energy, and an aptitude for business, we may contribute to the prosperity of our country while working for our own interests.

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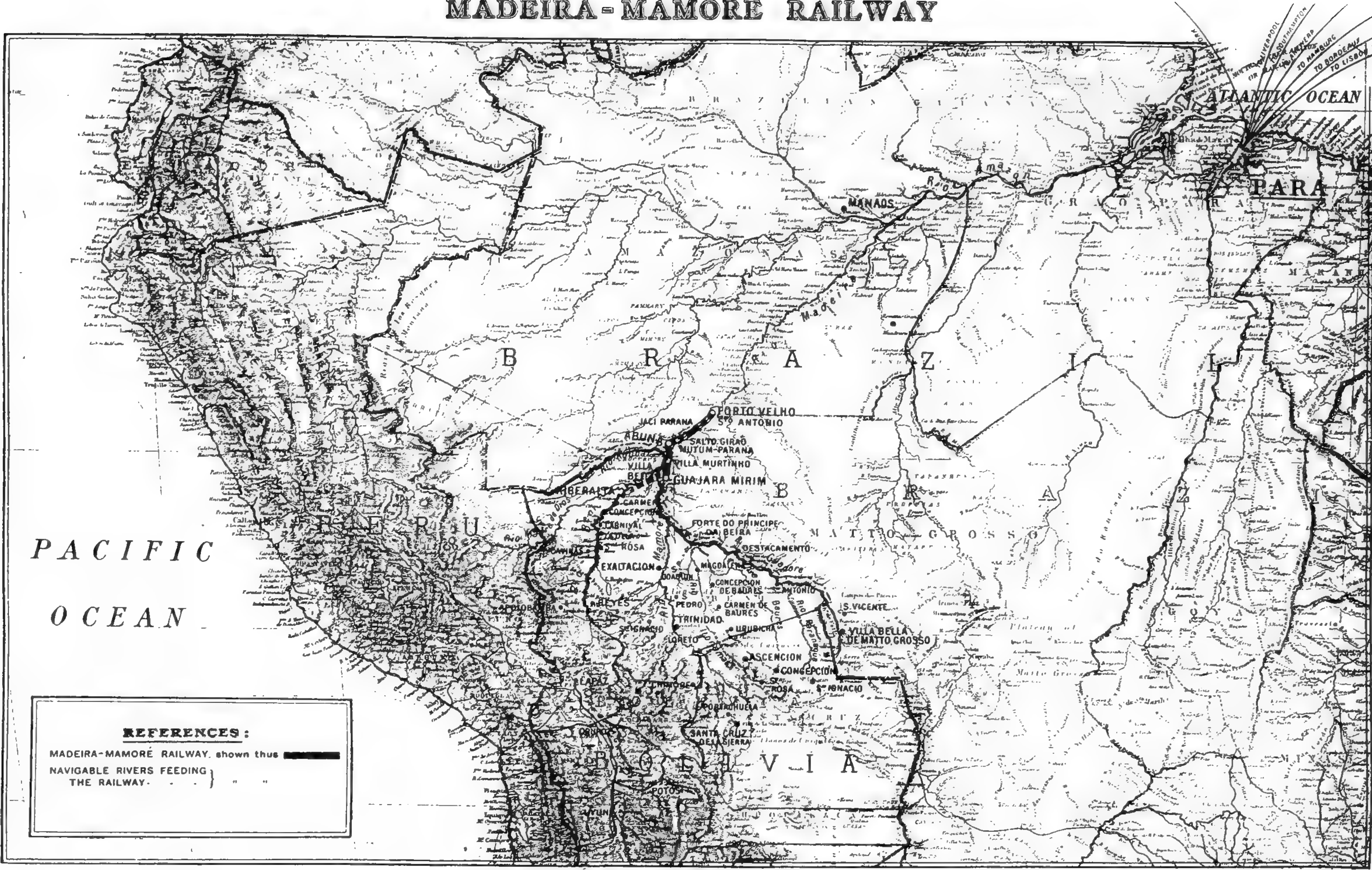
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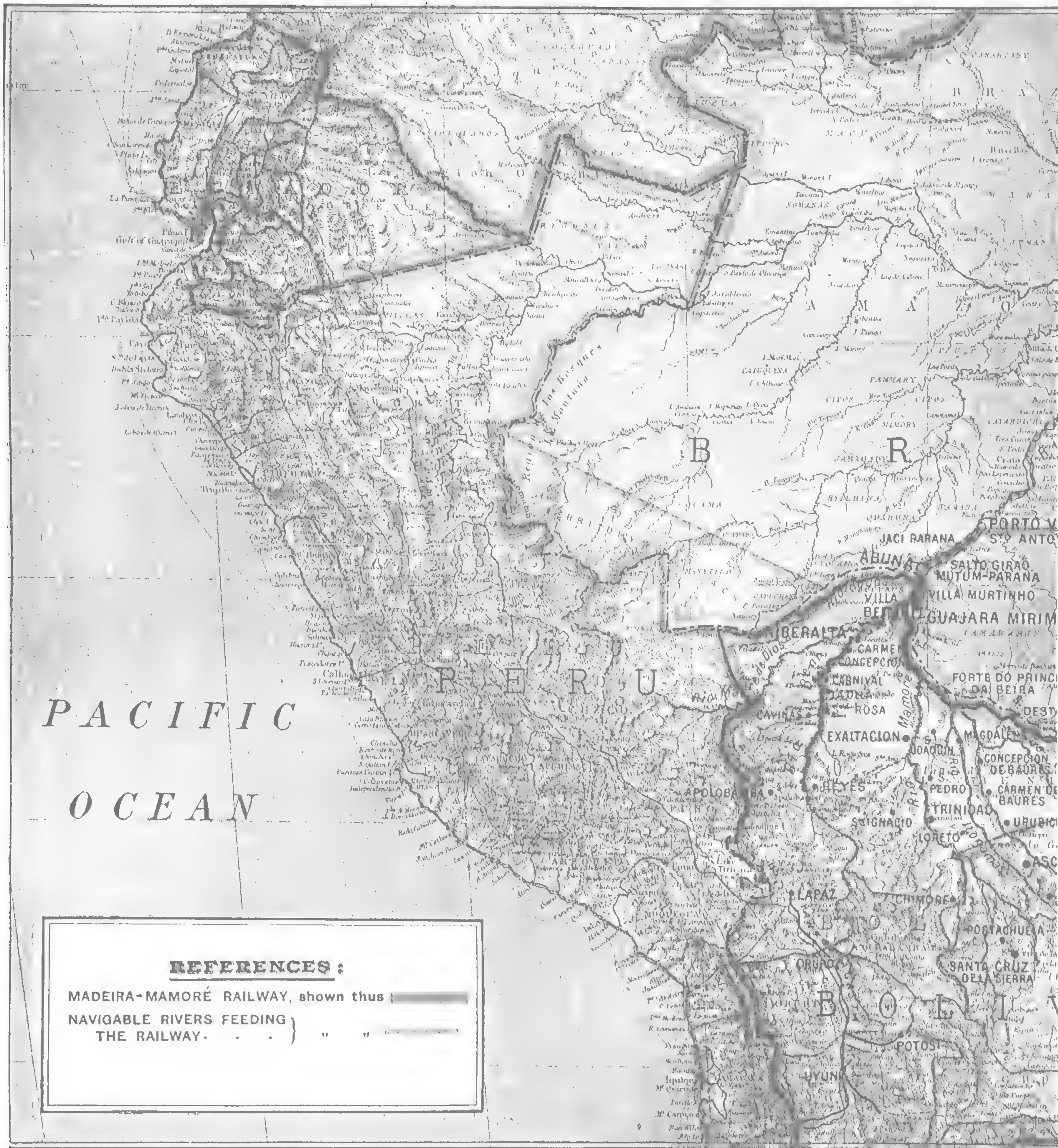
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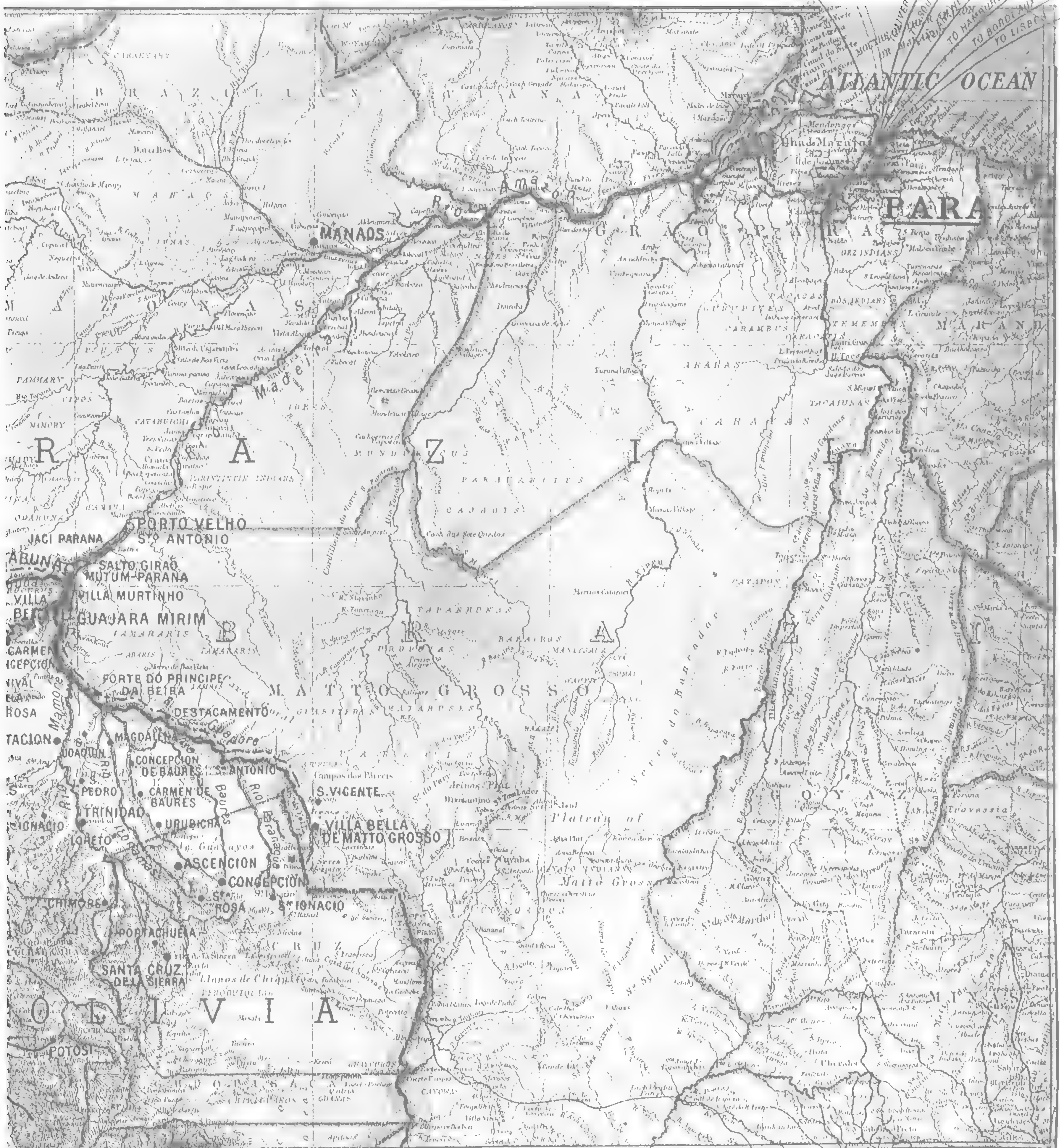
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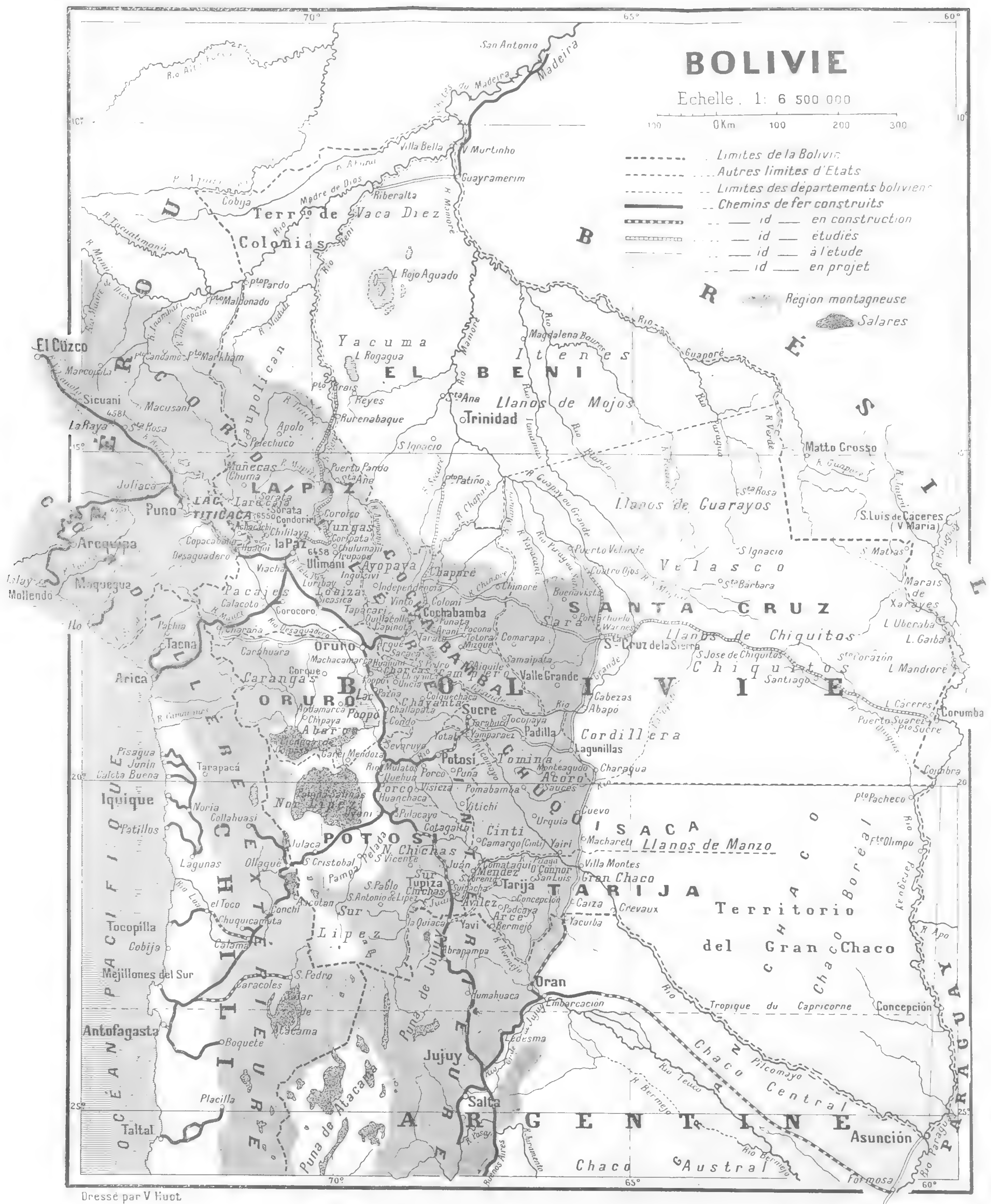
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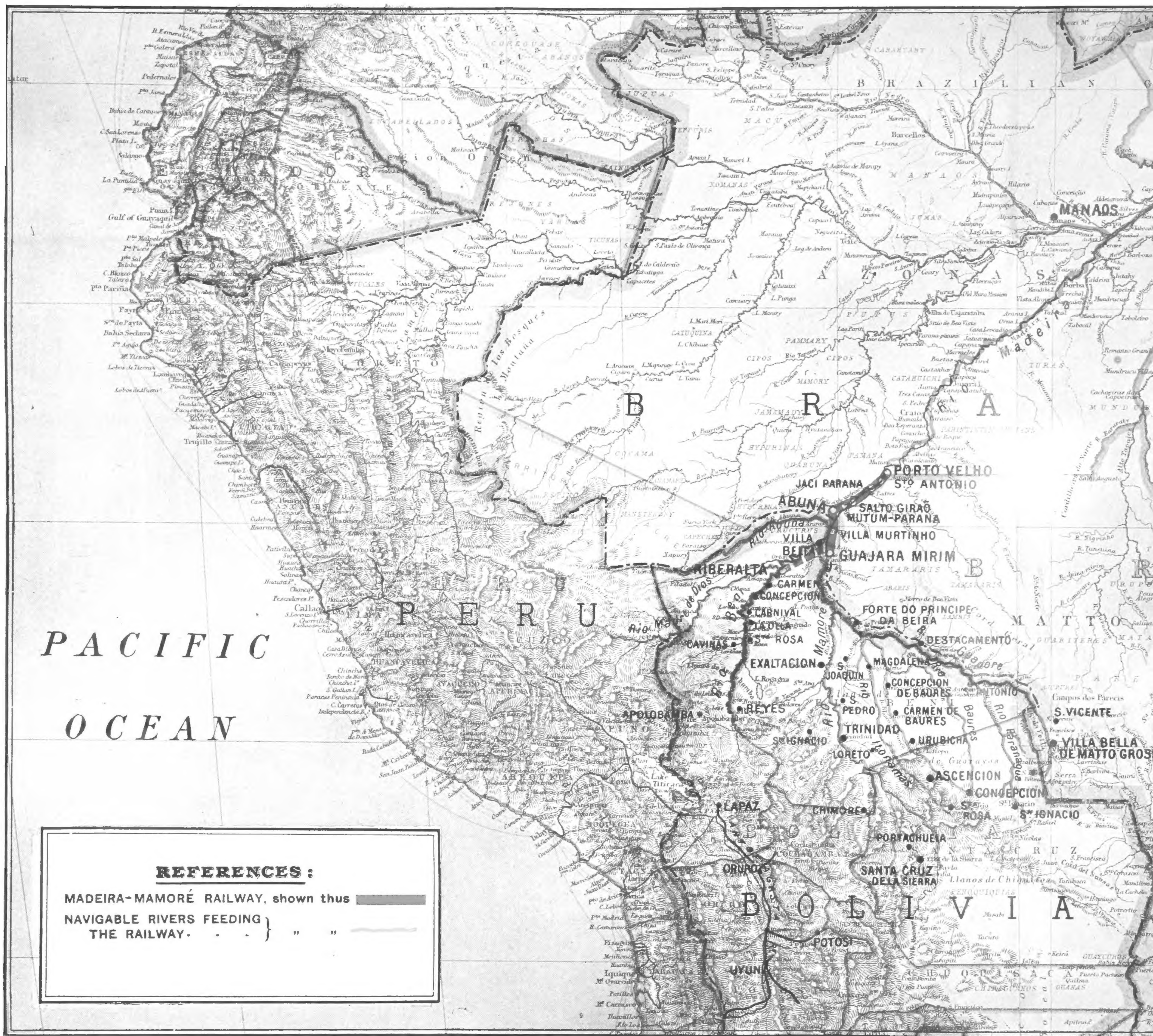


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